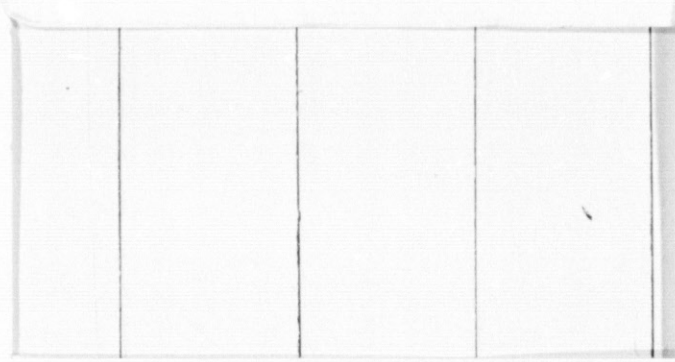


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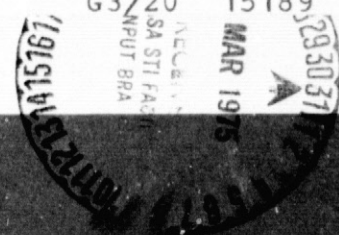


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PRESSURES OF A BODY OF REVOLUTION (Lockheed
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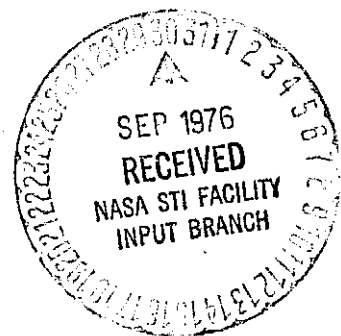
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FOREWORD

This report presents the results of a plume technology wind tunnel test in the NASA-MSFC 14 x 14-Inch Trisonic Wind Tunnel. The test was conducted by personnel of the Lockheed-Huntsville Research & Engineering Center for the Aero-Astroynamics Laboratory of the Marshall Space Flight Center under Contract NAS8-26801. The MSFC technical monitor for this study is Mr. C. Dale Andrews, S&E-AERO-AAE. This study was a coordinated effort with the Engineering Analysis Division of the Johnson Space Center under the auspices of Mr. Barney B. Roberts.

SUMMARY

An experimental aerodynamic investigation was conducted to provide data for studies to determine the criteria for simulating rocket engine plume-induced aerodynamic effects in the wind tunnel using a simulated gaseous plume. Model surface and base pressure data were obtained in the presence of both a simulated and a prototype gaseous plume for a matrix of plume properties to enable investigators to determine the parameters that correlate the simulated and prototype plume-induced data. This report describes the details of the test program and presents in plotted and tabular form the data that were obtained.

The test program was conducted in the Marshall Space Flight Center's 14x14-inch trisonic wind tunnel using two models, the first being a strut mounted cone-ogive-cylinder model with a fineness ratio of 9. Model exterior pressures, model plenum chamber and nozzle performance data were obtained at Mach numbers of 0.9, 1.2, 1.46 and 3.48. The exhaust plume was generated by using air as the simulant gas, or Freon-14 (CF_4) as the prototype gas, over a chamber pressure range from 0 to 2000 psia and a total temperature range from 50 to 600°F.

Three single nozzles and one triple nozzle were used for the air portion of the test and one single and one triple nozzle were used for the CF_4 testing. All of the nozzles were conical and ranged in area ratio from 3.5 to 8.0 with wall angles from 15 to 35 degrees. The location of each nozzle exit plane with respect to the model base and the ratio of each type (single or triple) nozzle exit diameter to the base diameter was held constant.

In addition to the strut model, a sting-mounted model of the same configuration was also tested prior to the gaseous plume test to assess strut and blockage effects. Number 60 carborundum grit was used on each model to ensure a turbulent boundary layer. All the testing was conducted at a zero-degree angle of attack.

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Section 1 INTRODUCTION

The interaction of the Space Shuttle's rocket engine exhaust plume and external flow field can affect performance and flying qualities as a result of plume-induced effects in the base region and boundary layer separation. To avoid potential problems in the prototype vehicle, it is desirable to be aware of the plume-induced effects during the design phase. These effects can be determined in the wind tunnel by testing the Shuttle vehicle in the presence of the rocket exhaust plume. Since it is not practical or economical to test the full-scale vehicle and engines, a scaled version of the vehicle with a simulated gaseous plume must be tested. To have a high degree of confidence in the test results, the simulated plume-flowfield interaction phenomena must be the same as that of the prototype plume. This requires a duplication of the prototype plume properties which govern the interaction. At the present time plume simulation technology is inadequate for predicting these governing properties. This inadequacy is primarily due to the lack of sufficient and appropriate simulated and prototype plume-induced aerodynamic data which can be analyzed to establish the correlating parameters. To alleviate this deficiency a wind tunnel test program was conducted in which extensive plume-induced aerodynamic data were obtained for both simulated and prototype gaseous plumes.

Model surface and base pressures were obtained in the presence of simulated and prototype plumes for a matrix of nozzle exhaust total pressures and temperatures as a function of freestream conditions and nozzle geometry.

Air was used as the simulant gas and CF_4 as the prototype gas. Air was chosen because of its ready availability at most wind tunnel facilities and its economic advantage over other simulant gases. Carbon tetrafluoride (CF_4) was selected as the prototype gas because the variation of its thermodynamic properties can be made to closely approximate those of a typical

rocket engine exhaust flow as shown in Fig. 1. Reference 1 contains a detailed description of the thermodynamic properties of CF_4 from the Reddick-Quang equation of state and the thermodynamic properties of air as calculated from the Beattie-Bridgeman equation of state. In addition, Ref. 1 presents the computed plume initial boundary angle and the viscous mixing parameter " μ " evaluated at the plume boundary for the nozzles tested during the program.

The test program consisted of three phases: (1) investigating the required grit size to ensure a turbulent boundary layer, blockage effects and strut and wall interference effects; (2) calibrating all nozzles at several chamber pressures and temperatures to qualify the nozzle hardware and to investigate real gas and condensation effects; and (3) generating nozzle exhaust flow to investigate plume-induced effects on the model surface and base pressures for both simulated and gaseous plumes.

The basic model for this investigation consisted of a strut-mounted cone-ogive-cylinder body with four different nozzle configurations to flow air and two nozzle configurations to flow CF_4 . A sting mounted model of the same configuration was also tested to assess strut interference effects. A heater and gas supply system was used to control the temperature and pressure of the working fluid. Chamber pressures were varied from 0 to 2000 psia and chamber temperature from 50 to 600°F. Model surface pressures and nozzle performance data were obtained at Mach numbers of 0.9, 1.2, 1.46 and 3.48 for various chamber conditions at zero degrees angle of attack. Carborundum grit was used to ensure a turbulent boundary layer over the model.

Section 2 TEST APPARATUS

2.1 TEST FACILITY DESCRIPTION

The test program was conducted in the NASA-MSFC 14-inch trisonic wind tunnel. The facility is an intermittent trisonic blowdown tunnel which exhausts either to a vacuum system or to atmosphere. The tunnel is capable of producing Mach numbers from 0.2 to 2.5 by utilizing a transonic test section and Mach numbers from 2.74 to 4.96 with a supersonic test section. Reynolds numbers per foot of up to 18,000,000 may be obtained depending upon the test Mach number and tunnel limits. A more detailed description of the facility is presented in the tunnel technical handbook (Ref. 2).

2.2 HEATER DESCRIPTION

A high-pressure gas system capable of supplying gas heated to a temperature of 600°F and 2000 psia was used for this test program. The heater is capable of a gas flow rate of up to 4 lb/sec for a period of 10 sec. The system is designed with three high-pressure storage tanks fabricated from heavy wall tubing. The first tank in the series circuit (cold tank) is a 4.2 cu ft tank used to accumulate gas from either small supply cylinders or the facility air system at low pressures. Two pneumatically driven compressors pump the gas to a pressure of 4000 psia in this tank. The maximum tank pressure is controlled by a relief valve set at 4300 psi and a 4600 psi rupture disk. The output of this vessel is pneumatically regulated and is used as the controlled supply for the second tank.

The second tank (hot tank) provides 6.9 cu ft of gas storage which can be electrically heated to supply the test requirements for jet exhaust simulation. The maximum pressure in the tank is controlled by a relief valve set at 2200 psi and a 2500 psi rupture disk. Maximum temperature of the clamp-on heaters is controlled by a 765°F sensing element.

To provide system flexibility and to prevent the loss of expensive gas, a 2.2 cu ft relief tank is provided. Gas can be removed from the hot tank and stored in the relief tank for later use if the hot tank is overcharged. The two compressors are also able to pump from the relief tank to the cold tank.

The output of the system is opened by pushing the CF_4 "discharge control valve" button. This activates the solenoid valve in a pneumatic circuit to move the actuator on a discharge valve. During the testing phase, the discharge button was synchronized with the tunnel data acquisition system. The discharge pressure of the system is controlled by setting a pressure with the "dome regulator control" prior to pushing the discharge button. Figure 2 is a summary schematic drawing of the heater.

A one-inch o.d. heated and insulated steel pipe was used to connect the heater to the model. The pipe was attached to the heater discharge valve and routed through the side of the tunnel, up through the tunnel floor and attached to the sting.

A more detailed description of the heater and its operating characteristics is presented in Ref. 3.

2.3 MODEL DESCRIPTION

● Strut Mounted Model

The model for Phases 2 and 3 of the test consisted of a strut-mounted cone-ogive-cylinder body (Fig. 3) with six interchangeable nozzles. The model was designed and fabricated by Micro Craft Inc., Tullahoma, Tenn., (Space Shuttle Plume Technology Model, assembly drawing number LD-520957). The body is made up of the nose section, midbody and afterbody. The midbody is rigidly attached to the strut and is composed of the nozzle plenum chamber and upper and lower removable skin panels which cover the plenum chamber. The nose section is attached to the midbody at the forward bulkhead and the

afterbody at the aft bulkhead. Figure 4 shows the cone-ogive-cylinder model installed in the wind tunnel and Fig. 5 shows typical single and triple nozzles.

The afterbodies for the single nozzle configurations are single pieces which attach at the aft bulkhead. The afterbodies for the triple nozzle configurations are in two pieces; a base of which the nozzles are an integral part and an adapter which fits between the base and the aft bulkhead. The same adapter was used for all triple nozzle configurations. This required routing the tubes in the base through the adapter prior to the model installation.

A metal O-ring was used to seal the interface between the aft bulkhead and the single nozzle afterbodies or triple nozzle adapter. Also three metal O-rings were used to seal the interface between the triple nozzle adapter and bases. Table 1 presents the pertinent geometrical information defining the respective nozzle configurations.

The model support consists of the strut, sting and sting adapter as shown in Fig. 6. The strut and sting shown in Fig. 3 are used not only to support the model but also to supply the simulant gas to the model. The pressure tubing was routed through the leading and trailing edges of the strut and along the lower and upper surfaces of the sting. The sting adapter was rigidly attached to the sting and was fitted into the tunnel main chuck.

Forty-nine static pressure orifices are located on the model and are distributed as follows:

- Nose 5
- Midbody 19
- Afterbody 25

The model plenum chamber is equipped with a total pressure probe, a static pressure orifice and a total temperature probe. In addition, five thermocouples were used to measure skin temperature at various points on the model. The location and numbering system for all of the pressure orifices and thermocouples are shown in Figs. 7a, 7b and 7c.

Nozzle pressure tubes 44, 45, 46 and 49 for the triple nozzle configurations and tubes 44, 45 and 48 for the single nozzle configurations were routed external to the model. These tubes were used only during the calibration phase of the test after which they were removed and plugged. The remaining nozzle tubes (47 and 48 for the triple and 46 and 47 for the single nozzle configurations) and the afterbody tubes (17 through 22, 29 through 34 and 37 through 43) are routed internal to the model and strut. The nozzle tubes were hard tubing all the way from the nozzle to outside the tunnel. The afterbody tubes were joined with vinyl tubing in the nose section (Fig. 3). For each nozzle configuration change the nozzle and afterbody tubes had to be disconnected and removed.

Scanivalves were used to record the model surface static pressures (Nos. 1 through 21 and 23 through 38) and base static pressures (Nos. 39 through 43). A total of 42 static pressures were measured with eight scanivalves. The pressure tubes were attached to the scanivalves in the order specified in Table 2. The nozzle internal static pressures (Nos. 44 through 48 for the single nozzles and 44 through 49 for the triple nozzles), the plenum chamber total (No. 51) and static (No. 50) pressures and model static pressure orifice No. 22 were recorded with individual transducers. Also instrumentation was provided to record the thermocouple output in the plenum chamber and on the surface of the model. The number and type of instrumentation used during Phases 2 and 3 are shown in Tables 3 and 4, respectively.

For Phase 1 of the test, the strut-mounted model was fitted with an afterbody that has a simulated rocket nozzle and an extension aft of the nozzle exit plane for attaching solid plumes. An installation photograph of this configuration is shown in Fig. 8. Figure 9 shows the same configuration with a solid plume installed.

In this configuration the model has 24 static pressure orifices. Orifices 1 through 22 are along the top centerline of the model and in the same locations as Orifices 1 through 22 in Fig. 7a. The remaining two orifices are located on the base and are numbered and located as shown on the next page.

Orifice No.	Radius (in.)	ϕ (deg)
40	.39	180
43	.63	180

Four scanivalves were used to measure the 24 static pressures. The scanivalve array and the number and type of instrumentation used in Phase 1 are shown in Tables 5 and 6, respectively.

● Sting-Mounted Model

The sting-mounted model consists of the same cone-ogive-cylinder body as the strut model. This model has a simulated rocket nozzle which is an integral part of the sting. Solid plumes can be attached to the sting at the exit plane of the nozzle. A sketch of the sting model is shown in Fig. 10.

This model also has 22 pressure orifices on the upper centerline and 2 orifices on the base. The orifices have the same numbering system and location as the strut configuration used in Phase 1.

Two solid plumes were used with both the sting and strut-mounted models. Dimensions of the solid plumes are given in Fig. 11. Figure 9 shows plume 2 installed on the strut model.

Section 3

TEST PROCEDURE AND CONDITIONS

The test was conducted at Mach numbers of 0.9, 1.2, 1.46 and 3.48 with the model at a zero-degree angle of attack. Nominal freestream conditions for the respective Mach numbers are given in Table 7. Model chamber pressures ranged from 0 to 2000 psia and chamber temperatures from 50 to 600°F.

The test program consisted of three separate phases.

● Phase 1

Phase 1 established the state of the boundary layer over the model for specified Mach and Reynolds number combinations to determine the size of carborundum grit required to ensure a turbulent boundary layer for all free-stream test conditions. Shadowgraphs of the sting model were obtained with and without grit to establish the boundary layer state.

The sting and strut models were tested with and without the solid plumes to assess strut interference effects and blockage effects on the model surface pressure distributions. These data were obtained with the porous walls and with the solid walls to determine wall effects. A static probe was used in conjunction with the models to determine blockage effects on the freestream Mach number. Shadowgraphs were obtained for all test conditions to supplement the pressure data.

● Phase 2

Phase 2 consisted of calibrating five of the six nozzle configurations at quiescent conditions. The area ratio 3.5, $\theta_{lip} = 35$ degree nozzle was not calibrated because it was built from the $A/A^* = 6.5$, $\theta_{lip} = 35$ degree nozzle

from which all but one of the nozzle static pressure orifices had been permanently removed subsequent to its calibration. At the completion of Phase 1, nozzles were installed in the model and connected to the high pressure supply source. Nozzle flow was initiated and data recorded simultaneously by means of the nozzle static pressure taps, plenum chamber instrumentation, test section static pressure instrumentation and schlieren photographs.

The test section pressure during calibration was on the order of 0.5 to 1.5 psia.

● Phase 3

After calibration of each nozzle, Phase 3 was initiated for that particular nozzle. The nozzle pressure tubes external to the model were removed and plugged and a 0.1-inch band of carborundum grit was placed approximately one inch from the nose of the model. During this phase the model surface and base pressure data were recorded. The various nozzles were tested for the specified Mach numbers and freestream conditions of Table 7 with the following parametric variations: nozzle area ratio and wall angle, chamber pressure and temperature, and simulant gas. Model surface and base static pressures, freestream conditions, plenum chamber conditions and nozzle conditions were recorded for each run. Representative schlieren photographs were obtained for Mach numbers of 0.9, 1.2 and 1.46 and schlierens of each run were taken at a Mach number of 3.48. A more detailed description of the test procedure is available in Ref. 4.

Section 4

DATA ACCURACY

The estimated accuracy of the data is as follows:

● Tunnel Conditions

Freestream total pressure	±0.05 psia
Freestream static pressure	±0.015 psia

● Model Surface and Base Pressures

M _∞ = 0.9, 1.2 and 1.46	±0.113 psia
M _∞ = 3.48	±0.038 psia

● Nozzle Internal Pressures

Air Single Nozzle, $A/A^* = 6.5$, all nozzle orifices ±0.227 psia
 Air Single Nozzle, $A/A^* = 3.5$, all nozzle orifices ±1.13 psia
 Air Triple Nozzle, $A/A^* = 4.0$, all nozzle orifices ±1.13 psia
 CF₄ Single Nozzle, $A/A^* = 8.0$, orifice 44 ~ +3.75 psia,
 orifices 45, 46 and 47 ~ ±0.227 psia,
 orifice 48 ~ ±1.125 psia
 CF₄ Triple Nozzle, $A/A^* = 8.0$, all nozzle orifices ±0.227 psia

● Model Plenum Chamber Conditions

Total and static pressures	±18.75 psia
Total temperature	±2°F

Section 5

DISCUSSION AND DATA PRESENTATION

This section presents typical data resulting from the three phases of the test program and where necessary (such as Phase 1 where it was required to establish possible interference effects) discusses the results.

5.1 PHASE 1

Phase 1 of the test was conducted to determine the grit size required to generate a turbulent boundary layer over the model and to determine possible interference effects.

Since the boundary layer over most flight vehicles is predominantly turbulent for the Mach numbers investigated, it was decided to fix the boundary layer type for all test conditions in Phase 3.

From the methods of Ref. 5, it was determined that No. 60 grit would be adequate to ensure a turbulent boundary layer for all the Mach and Reynolds number combinations of Table 7. To confirm this, shadowgraphs were taken of the sting mounted model with and without grit on the model. A 0.1-inch band of the No. 60 grit was placed approximately one inch from the model nose. The shadowgraphs indicated for all Mach numbers that without grit, boundary layer transition occurred on the cylinder portion of the model as shown in Fig. 12 for Mach 1.46. With the No. 60 grit on the model transition occurred at or near the transition strip for all Mach numbers, as shown in Fig. 13 for Mach 1.46.

The strut interference effects were assessed by comparing sting and strut model pressure data for all Mach numbers. Sting and strut model surface pressure are compared at $\phi = 0$ deg for Mach numbers of 0.9, 1.2,

1.46 and 3.48 in Figs. 14 through 17. The comparisons indicate that strut interference generally decreases the local static pressures of the strut model at certain points along the afterbody depending on the Mach number. The decrease in the static pressure appears to move farther aft on the model as Mach number is increased until the interference becomes negligible at Mach 3.48. This is probably due to the decrease in the strut bow shock angle as Mach number is increased.

A comparison of the strut model pressure distribution for radial locations of 0, 60 and 180 deg is shown in Figs. 18 through 21. For Mach numbers of 0.9 and 1.2 the pressures at $\phi = 0, 60$ and 180 deg compare favorably near the base of the model but differ to some extent upstream. For Mach numbers of 1.46 and 3.48 the pressures at 60 and 180 deg are generally significantly different from those at 0 deg.

Also shown in Figs. 18 through 21 are comparisons of base pressures as a function of angular orientation. At each Mach number the base pressures generally agree with only slight variation.

The strut and model frontal area with respect to the tunnel test section area (196 in^2) represents a blockage of 2.8%. For Mach numbers of 0.9, 1.2 and 1.46 the strut model blockage exceeds the preferred limit of 2.5%. When the model is tested with nozzle flow, the blockage ratio for high chamber pressures may increase to an even greater value. Consequently, to assess the effects of blockage, the sting and strut mounted models were tested with two sizes of solid plumes and compared to the no plume data. Blockage for the models and plume-model combinations are shown in Table 8. The overall dimensions of the plumes are given in Fig. 11.

Figures 22 through 24 show the solid plume effects on the model surface pressures. As the plume size is increased, the plume-induced separation moves forward on the body. Upstream of the separation point the strut model data for all cases agree very well. Pressure data for the sting model

and plume 2 are also shown on the figures. These data compare favorably at Mach 0.9 and 1.2 and vary slightly at Mach 1.46.

To determine the effects of blockage on the freestream Mach number, a static pressure probe was placed approximately 1.5 inches forward of the strut model nose. Probe data were obtained with no plume and plume number 2 at Mach 0.9, 1.2 and 1.46. Figure 25 compares the probe Mach number and the test section Mach number as a function of percent blockage. There are small differences at each Mach number with a maximum deviation of 1.6% at Mach 1.2 and a percent blockage of 2.76. The differences obtained were not considered to be of sufficient magnitude to compromise the test program.

It was originally planned to obtain schlierens and pressure data simultaneously for all runs in Phase 3. This would require using glass instead of porous walls at Mach 0.9, 1.2 and 1.46 where the porous walls are normally used when pressure data are taken. To assess the feasibility of using the glass walls while taking pressure data, the strut model was tested using both the porous and glass walls.

Figures 26 through 28 compare the porous and glass wall data. At Mach 0.9 the data compare well but at Mach 1.2 and 1.46 significant differences are apparent.

Based on the results of Phase 1 the following conclusions were reached concerning the suitability of using the strut model in the 14-inch tunnel:

1. Using No. 60 grit, a turbulent boundary layer existed over the model for all test conditions.
2. Strut interference effects at $\phi = 0$ deg were apparent but were not of a sufficient magnitude to jeopardize the test program. The interference effects at 60 and 180 deg were

such that it is recommended that these data not be used for assessing plume induced effects.

3. Blockage had no significant effect on the data when the porous walls were used for the transonic testing.
4. Only pressure data with porous walls installed should be used for the transonic Mach numbers of 0.9, 1.2 and 1.46. Pressure data obtained with the glass walls should not be used for data analysis at these Mach numbers.

5.2 PHASE 2

Phase 2 of the test was conducted to verify the gasdynamic performance of the various nozzles to be tested, to determine if condensation of the flow was taking place inside the nozzles, and to determine if real gas effects could adequately be accounted for.

Static pressure distributions for each of the nozzles at typical test conditions are presented in Figs. 29 through 34. Preliminary analysis of the nozzle static pressures indicates some discrepancies between the experimental results and inviscid method-of-characteristics calculations. Further analysis will be conducted to resolve this. The findings of the analysis will be presented at a later date. Condensation was possible in the $A/A^* = 6.5$ nozzle for high chamber pressure and low chamber temperature conditions and may have occurred.

Real gas effects were examined by comparing calculated inviscid real gas plume shapes to schlieren photographs for several of the calibration data points. As seen in Figs. 35 and 36 the theory adequately predicts the plume shape, particularly the plume internal shock which is largely unaffected by the viscous mixing at the plume boundary for conditions in which little or no condensation took place.

Figure 37, compared with Fig. 38, demonstrates that the effect of condensation on the plumes internal shock structure and plume boundary is to increase the size of the plume. The increase in size is most probably the result of the exothermic condensation process which results in an increase of

the local static pressure and a reduction of the local Mach number consequently requiring a larger amount of turning to expand to a given freestream static pressure.

Subsequent to the test it was determined that the test section pressure was not correctly recorded for the calibration runs associated with the $A/A^* = 3.5$, $\theta_{lip} = 25$ deg air nozzle and the $A/A^* = 8.0$ CF_4 triple nozzle; therefore, no plume shape data are given for these runs. The pressures associated with the model are accurate for these runs and suitable for use in verifying the performance of the nozzle.

Table 9 presents a summary of the calibration runs made for the various nozzle configurations and a detailed run log with any qualifying comments pertinent to each data point is presented in Table 11.

5.3 PHASE 3

Phase 3 consisted of an investigation of the interaction of the model exhaust plume with the flow along the surface of the model and in the base region. This investigation was conducted by varying the following parameters: freestream Mach number, nozzle area ratio, nozzle conical divergence angle, the exhaust total pressure, exhaust total temperature, and the simulant exhaust gas. Mach numbers of 0.9, 1.2, 1.46 and 3.48 were run with the nozzles defined in Table 1. Two simulant exhaust gases were tested, air and CF_4 . All of the testing was conducted at a zero-degree angle of attack.

Measured static pressure distributions along the top surface of the model (180 deg from the support strut) for each nozzle configuration and test Mach number are plotted in Figs. 39 through 71. These plots represent the minimum and maximum chamber pressure and nominal temperature conditions that were tested. If a significant upstream propagation of the base pressure was measured, as in Figs. 47 and 48, the entire set of data for that test condition is presented.

Base pressure distributions $p_{\text{base}}/p_{\infty}$ for a representative base pressure orifice are plotted as a function of P_c/p_{∞} for each configuration and nominal chamber temperature in Figs. 72 through 92.

A summary of the non-quiescent runs made for the various configurations is given in Table 10 and a detailed run log with any qualifying comments pertinent to each data point is presented in Table 11.

A complete set of the gaseous pressure data obtained during Phases 2 and 3 is presented in tabular form in Appendix A. Appendix B contains a tabular listing of the plume coordinates for each photograph taken during the test.

REFERENCES

1. Baker, L.R., and M.M. Penny, "Plume Technology Experimental Program Pretest Analysis," LMSC-HREC TM D306910, Lockheed Missiles & Space Company, Huntsville, Ala., October 1973.
2. Simon, Erwin, "The George C. Marshall Space Flight Center's 14 x 14-Inch Trisomic Wind Tunnel Technical Handbook," NASA TM-X-64624, November 1971.
3. Cooper, C.E., "Updated Operational Procedures of the NASA-MSFC High Pressure Gas Heating System," TN D306709, Lockheed Missiles & Space Company, Huntsville, Ala., (in preparation).
4. Andrews, C. Donald, and C.E. Cooper, "Pretest Report for a Plume Technology Test Program in the MSFC 14 x 14-Inch Trisomic Wind Tunnel," LMSC-HREC TM D306631, Lockheed Missiles & Space Company, Huntsville, Ala., May 1973.
5. Braslow, A.L., and E.C. Knox, "Simplified Method for Determination of Critical Height of Distributed Roughness Particles for Boundary Layer Transition at Mach Numbers from 0 to 5," NACA TN 4363, September 1968.

Table 1
PLUME TECHNOLOGY TEST MODEL NOZZLE GEOMETRY

Nozzle No.	Gas	Nozzle Config.	A/A* (in.)	θ_{lip} (deg)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)
1	CF ₄	Single	(8.0) ⁺ 7.90	(15) 14.92	0.247	0.695	(.750)	0.978	(.312)
2	Air	Single	(3.5) ⁺ 3.51	(25) 23.22	0.372	0.698	(.750)	0.513	(.312)
4	Air	Single	(6.5) ⁺ 6.52	(35) 34.77	0.273	0.697	(.500)	0.471	(.312)
4A	Air	Single*	(3.5) ⁺ 3.45	(35) 34.77	0.375	0.697	(.188)	0.282	(.312)
5	CF ₄	Triple Nozzle A Nozzle B Nozzle C	(8.0) ⁺ 8.21 8.17 8.05	(15) 15.10 15.12 15.08	0.143 0.141 0.143	0.404 0.403 0.404	(.375)	0.523 0.518 0.525	(.312)
6	Air	Triple Nozzle A Nozzle B Nozzle C	(4.0) ⁺ 4.06 4.01 4.03	(25) 24.85 24.58 24.83	0.200 0.201 0.199	0.404 0.402 0.400	(.400)	0.322 0.328 0.335	(.312)

* Built during test from a A/A* = 6.5, $\theta_{lip} = 35^\circ$ air single nozzle
⁺ (design dimension)
Actual Dimension

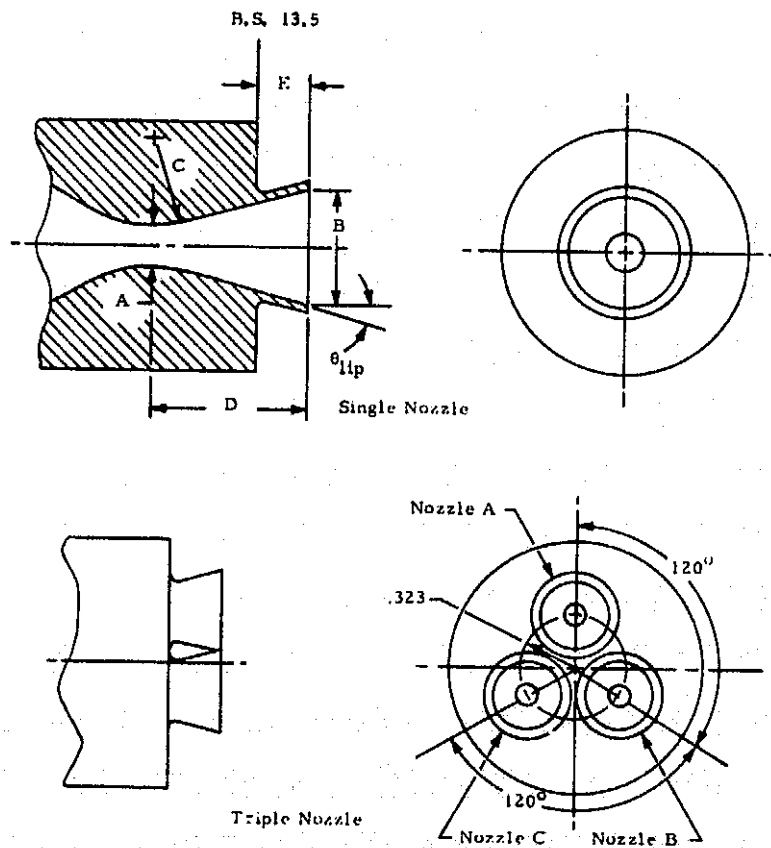


Table 2
PLUME TECHNOLOGY TEST SCANIVALVE ARRAY
FOR PHASE 3

Port No. \ Scani- valve No.	1	2	3	4	5	6	7	8
0	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
1	5	6	11	16	23	29	34	35
2	4	7	12	17	24	30	41	36
3	3	8	13	18	25	31	42	37
4	2	9	14	19	26	32	39	38
5	1	10	15	20	27	33	40	43
6				21	28			

* This corresponds to the frame number of the data presented in Appendix A.

Table 3
PHASE 2 INSTRUMENTATION
Pressure Instrumentation

Description	Orifice No.	No. of Transducers*	Transducer Pressure Range for Each Nozzle Configuration				
			A/A* = 8.0 $\theta_{lip} = 15^\circ$ Single	A/A* = 3.5 $\theta_{lip} = 25^\circ$ Single	A/A* = 6.5 $\theta_{lip} = 35^\circ$ Single	A/A* = 8.0 $\theta_{lip} = 15^\circ$ Triple	A/A* = 4.0 $\theta_{lip} = 25^\circ$ Triple
Nozzle Static Pres.	44	1	0-500 psia	0-150 psia	+30 psid	+30 psid	0-150 psia
	45	1	+30 psid				
	46	1	+30 psid				
	47	1	+30 psid				
	48	1	0-150 psia	0-150 psia	+30 psid		
Nozzle Static Pres.	49	1	—	—	—	+30 psid	0-150 psia
Chamber Static Pres.	50	1	0-2500 psia	0-2500 psia	0-2500 psia	0-2500 psia	0-2500 psia
Chamber Total Pres.	51	1	0-2500 psia	0-2500 psia	0-2500 psia	0-2500 psia	0-2500 psia

* All transducers were Stathams.

Temperature Instrumentation

Description	Thermocouple No.	No. of Thermocouples	Type of Thermocouple	Approximate Temp. Range (°F)
Model Surface Static Temp.	TC1	1	Chromel-Alumel	50-650
	TC2	1		
	TC3	1		
	TC4	1		
Model Surface Static Temp.	TC5*	1		
Chamber Total Temp.	TC6	1		50-650
Sting Static Temp.	TC7	1		50-1000
Feeder Pipe Temp.	TC8	1	Chromel-Alumel	50-1000

* Used only during runs 101 through 114.

Table 4
PHASE 3 INSTRUMENTATION
Pressure Instrumentation

Description	Orifice No.	No. of Scanivalves	No. of Transducers*	Transducer Pressure Range for Each Mach Number	
				M = 0.9, 1.2, 1.46	M = 3.48
Model Static Pres.	22	—	1	±15 psid	0-5 psia
	1-5	1	1		
	6-10	1	1		
	11-15	1	1		
	16-21	1	1		
	23-28	1	1		
	29-33	1	1		
	34, 41, 42				
Model Static Pres.	39 and 40	1	1		
	35, 36, 37			±15 psid	0-5 psia
	38 and 43	1	1		
Nozzle Wall Static Pres.	47	—	1	See Table 3, Orifice No. 47	See Table 3, Orifice No. 47
Chamber Total Pres.	51	—	1	0-2500 psia	0-2500 psia

* All transducers were Stathams.

Temperature Instrumentation

Description	Thermocouple No.	No. of Thermocouples	Type of Thermocouple	Approximate Temp. Range (°F)
Model Surface Static Temp.	TC1	1	Chromel-Alumel	50-650
	TC2	1		
	TC3	1		
Model Surface Static Temp.	TC4	1		
Chamber Total Temp.	TC6	1		50-650
Sting Static Temp.	TC7	1		50-1000
Feeder Pipe Temp.	TC8	1	Chromel-Alumel	50-1000

Table 5
SCANIVALVE ARRAY FOR PHASE 1

Scanivalve No. Port No.	1	2	3	4
0	Ref	Ref	Ref	Ref
1	6	7	13	19
2	5	8	14	20
3	4	9	15	21
4	3	10	16	22
5	2	11	17	40
6	1	12	18	43

Table 6
PHASE 1 INSTRUMENTATION

Description	Orifice No.	No. of Scanivalves	No. of Transducers*	Transducer Pressure Range for Each Mach Number	
				M = 0.9, 1.2, 1.46	M = 3.48
Model Static Pres.	1-6	1	1	+15 psid	0-5 psia
Model Static Pres.	7-12	1	1		
Model Static Pres.	13-18	1	1		
Model Static Pres.	19-22, 40 and 43	1	1		0-5 psia
Static Probe Pres.	—	—	1	+15 psid	—

* All transducers were Stathams.

Table 7
NOMINAL FREESTREAM CONDITIONS

M_{∞}	$P_{t\infty}$ (psia)	P_{∞} (psia)	$T_{t\infty}$ (°F)	R/L $\times 10^{-6}$ (1/ft)
0.9	18	10.7	100	5.1
1.2	18	7.4	100	5.5
1.46	18	5.1	100	5.2
3.48	90	1.22	110	10.3

Table 8
MODEL BLOCKAGE IN THE 14-INCH TUNNEL

Model	Plume No.	Blockage Ratio* (percent)
Strut	None	2.76
Strut	1	3.95
Strut	2	6.85
Sting	None	0.90
Sting	1	2.20
Sting	2	5.27

* Model frontal area ratioed to tunnel cross section area (196 in.²).

Table 9
CALIBRATION DATA SUMMARY

Air Single Nozzle $A/A^* = 6.5, \theta_{lip} = 35^\circ$					Air Single Nozzle $A/A^* = 3.5, \theta_{lip} = 25^\circ$			Air Triple Nozzle $A/A^* = 4.0, \theta_{lip} = 25^\circ$				
P_c (psia) \ T_c (°F)	100	250	400	500	P_c (psia) \ T_c (°F)	100	500	P_c (psia) \ T_c (°F)	60	200	400	500
100	101				200		301	400		408	404	
200		219		108	400		302	800			403	
300	102				600	382	303	1300			402	
400		220		109	900	383	304	1600	405		401	406
450	103				1300		306					
650		221		110	1450	384	307					
800			222	111	1700	385						
950	104		223	112								
1300	105		224	113								
1750	106			114								

CF ₄ Triple Nozzle $A/A^* = 8.0, \theta_{lip} = 15^\circ$				CF ₄ Single Nozzle $A/A^* = 8.0, \theta_{lip} = 15^\circ$ Air Calib.		CF ₄ Single Nozzle $A/A^* = 8.0, \theta_{lip} = 15^\circ$ CF ₄ Calib.		
P_c (psia) \ T_c (°F)	100	400	500	P_c (psia) \ T_c (°F)	500	P_c (psia) \ T_c (°F)	200	500
500			603	500	501	500	514	506
1000	601	602	604	1000	502	1000	513	507
1500			605	1300	504	1500	512	508
1750			606	1700	504	2000	511	509
				2000	505			

NOTE: P_c and T_c are nominal set values and varying considerably from these values. See Table 11 for the actual values.

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Table 11
PLUME TECHNOLOGY TEST RUN LOG

Run Number	Nozzle Configuration	Test Gas	M_∞	T_c (°F)	P_c (psia)	Comments
101 [†]	Single $A/A^* = 6.5$ $\theta_{lip} = 35^\circ$ ↓	Air ↓	0	81.	114.	Calibration Data Points ↓
102 [†]			0	96.	270.	
103 [†]			0	101.	469.	
104 [†]			0	114.	934.	
105 [†]			0	116.	1350.	
106 [†]			0	106.	1700.	
107 [†]			0	450.	1780.	
108 [†]			0	438.	210.	
109 [†]			0	467.	409.	
110 [†]			0	469.	655.	
111 [†]			0	506.	815.	
112 [†]			0	505.	952.	
113 [†]			0	533.	1250.	
114 [†]			0	549.	1750.	
115 [†]			0.9	200.	411.3	
116	↓	↓	↓	242.	753.1	Tap 18 bad ↓
117			↓	226.5	1121.	
118			↓	225.	1485.	
119 [†]			↓	207.	1832.	
120 [†]			1.2	207.	1836.	
121			↓	210.	1470.	
122			↓	215.	1127.	
123			↓	216.	759.	
124 [†]			↓	212.	382.	
125 [†]			1.467	247.4	479.6	
126			1.470	246.0	821.7	
127			1.481	225.0	1170.2	
128			1.482	236.3	1580.5	
129 [†]	Single $A/A^* = 6.5$ $\theta_{lip} = 35^\circ$	Air	1.488	253.8	1829.0	

[†]Schlieren photograph taken.

Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M_∞	T_c (°F)	P_c (psia)	Comments
130 [†]	Single $A/A^* = 6.5$ $\theta_{lip} = 35^\circ$ ↓	Air ↓	3.480	270.7	1856.5	Taps 17, 18, 19, 33, 40 bad ↓
131 [†]			3.480	263.9	1488.7	
132 [†]			3.480	242.8	1149.1	Tap 18 bad ↓
133 [†]			3.480	277.1	777.2	
134 [†]			3.480	244.4	380.4	Tap 18, 27 bad ↓
145			1.2	278.	376.	
146			↓	297.	799.	
147			↓	299.	1111.	
148			↓	305.	1445.	
149			↓	310.	1826.	
150			0.9	303.	1735.	
151			↓	300.	1421.	
152			↓	297.	1089.	
153			↓	301.	846.	
154			↓	286.	378.	
155 [†]			↓	347.	372.	
156			↓	376.	749.	
157			↓	389.	1149.	
158			↓	396.	1510.	
159 [†]			↓	397.	1822.	
160 [†]			1.2	395.	1836.	
161			↓	389.	1443.	
162			↓	383.	1075.	
163			↓	382.	795.	
164 [†]			↓	363.	381.	
165 [†]			1.462	372.0	408.1	
166			1.461	387.4	760.8	
167			1.476	392.0	1154.7	
168	Single $A/A^* = 6.5$ $\theta_{lip} = 35^\circ$	Air ↓	1.482	401.7	1569.4	
169 [†]			1.487	410.5	1845.2	
185			1.196	416.9	393.5	
186			1.203	444.9	795.5	

[†]Schlieren photograph taken.

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Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M_{∞}	T_c (°F)	P_c (psia)	Comments
187	Single $A/A^* = 6.5$ $\theta_{lip} = 35^\circ$	Air	1.207	457.9	1134.0	Taps 18, 27 bad
188			1.207	447.2	1478.6	
189			1.207	470.	1851.	
190			0.898	483.1	1825.9	
191			0.902	466.6	1476.9	
192			0.902	462.4	1162.4	
193			0.892	441.0	749.1	
194			0.900	412.4	412.2	
195			0.897	525.7	386.5	
196			0.906	560.3	765.8	
197			0.899	572.7	1124.1	
198			0.905	581.5	1421.1	
199			0.906	589.8	1829.0	
200 [†]			1.198	574.1	1826.1	
201			1.201	571.4	1445.3	
202			1.200	575.3	1144.6	
203			1.198	562.1	785.4	
204 [†]			1.195	528.2	384.8	
205 [†]			1.437	527.3	336.7	
206			1.471	556.4	753.2	
207			1.440	585.3	1075.1	
208			1.455	587.0	1492.7	
209 [†]	Single $A/A^* = 6.5$ $\theta_{lip} = 35^\circ$	Air	1.456	597.2	1863.3	Tap 18 bad, Jet off run Jet off run Jet off run Jet off run
210 [†]			3.480	535.3	428.4	
211 [†]			3.480	563.2	795.0	
212 [†]			3.480	564.9	1186.4	
213 [†]			3.480	559.9	1521.1	
214 [†]			3.480	559.2	1828.0	
215 [†]			0.900			
216 [†]			1.208			
217			1.457			
218 [†]			3.480			
219 [†]			0	168.	192.	Calibration Data Point
220 [†]			0	252.	372.	Calibration Data Point

[†]Schlieren photograph taken.

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Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M_∞	T_c (°F)	P_c (psia)	Comments
221 [†]	Single $A/A^* = 6.5$ $\theta_{lip} = 35^\circ$ ↓ Single $A/A^* = 3.5$ $\theta_{lip} = 25^\circ$ ↓ Single $A/A^* = 3.5$ $\theta_{lip} = 25^\circ$	Air	0	279.	555.	Tap 18 bad, Calibration Data Points ↓ Tap 43 bad ↓ Taps 22 and 39 reversed } Taps 22 and 39 reversed } * Taps 22 and 39 reversed } Tap 21 bad ↓
222 [†]			0	346.	807.	
223 [†]			0	391.	1000.	
224 [†]			0	441.	1268.	
301 [†]			0	480.	182.	
302 [†]			0	524.	409.	
303 [†]			0	536.	632.	
304 [†]			0	521.	923.	
306			0	562.	1286.	
307			0	580.	1452.	
308 [†]			3.480	63.7	454.5	
309 [†]			3.480	42.6	1097.2	
310 [†]			3.480	87.6	1430.1	
311 [†]			3.480	95.7	1567.1	
312 [†]			1.477	53.7	1697.6	
313			1.476	52.1	1426.4	
314			1.477	50.4	980.2	
315 [†]			1.459	52.5	507.3	
316			1.208	111.6	514.6	
317			1.206	51.3	1506.0	
318			1.207	47.7	1496.5	
319 [†]			1.207	51.4	1737.5	
320 [†]			0.909	48.9	1712.6	
321			0.910	50.8	1410.8	
322			0.908	49.9	947.6	
323		Air	0.903	57.9	469.8	

* Tap 21 bad.

[†]Schlieren photograph taken.

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Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M_{∞}	T_c (°F)	P_c (psia)	Comments
328	Single $A/A^* = 3.5$ $\theta_{lip} = 25^\circ$ ↓	Air ↓	1.186	430.7	1479.4	Tap 21 bad. Taps 1, 2, 3 bad on this run, 22 and 39 reversed ↓ Tap 21 bad ↓
329			1.189	423.6	1251.8	
336†			3.480	117.8	1613.0	
337†			3.480	85.6	987.9	
340†			3.480	215.0	431.6	
341†			3.480	226.7	69.7	
342			3.480	228.0	40.9	
343†			3.480	240.4	5.5	
344			1.478	249.9	80.7	
345			1.482	256.9	1216.9	
346			1.479	270.0	861.0	
347			1.459	277.7	459.8	
349			1.206	244.6	855.9	
350			1.203	251.1	1223.9	
351			1.203	248.6	1603.9	
352			0.907	252.4	1574.2	
353			0.905	248.2	1214.7	
354			0.906	242.0	864.7	
356†			0.888	492.5	463.9	
357			0.901	506.6	838.3	
358			0.901	529.8	1228.9	
359†			0.902	520.4	1508.1	
360†			1.208	554.8	1607.5	
361			1.211	544.7	1233.4	
362			1.168	518.6	852.0	
363†			1.194	483.8	453.7	
364†			1.468	467.1	462.1	
365	Single $A/A^* = 3.5$ $\theta_{lip} = 25^\circ$	Air	1.484	501.5	845.9	↓
366			1.491	530.8	1230.4	
367†			1.487	528.2	1590.0	

†Schlieren photograph taken.

Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M _∞	T _c (°F)	P _c (psia)	Comments	
370 [†]	Single A/A* = 3.5 θ _{lip} = 25°	Air	3.480	506.8	854.1	No. 21 bad. Taps 22 and 39	
372			0.901			Jet Off reversed	
373			1.200			Runs	
374			1.464				
375 [†]			3.480				
376 [†]			3.480	483.8	428.0	Tap 21 bad. Taps 22 and 39	
377 [†]			3.480	521.9	1502.5	reversed	
379 [†]			3.480	401.1	855.3		
380 [†]			3.480	399.7	1224.6		
381 [†]			3.480	384.8	1495.2		
382 [†]	Single A/A* = 3.5 θ _{lip} = 25°		0	131.6	523.2	Calibration Data Points	
383 [†]			0	73.6	941.1		
384 [†]			0	52.5	1396.0		
385 [†]			0	48.8	1701.5		
401 [†]	Triple A/A* = 4.0 θ _{lip} = 25°		0	385.	1650.		
402 [†]			0	383.	1300.		
403 [†]			0	380.	753.		
404 [†]			0	380.	476.		
405 [†]			0	60.	1500.		
406 [†]	Triple A/A* = 4.0 θ _{lip} = 25°		0	505.	1680.		
408 [†]			3.480	237.	487.		
409 [†]			3.480	237.3	889.3		
410 [†]			3.480	224.5	1303.6		
411 [†]			3.480	218.5	1636.3		
412			1.473	284.9	1562.1	Taps 34, 42 bad	
413			1.461	245.9	1262.7		
414			1.463	233.1	908.4		
415			1.446	211.8	466.9		
416			1.201	201.6	485.9		
417			1.201	216.8	915.0		
418	Air	1.201	225.2	1312.8			

[†]Schlieren photograph taken.

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Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M_∞	T_c (°F)	P_c (psia)	Comments
419	Triple $A/A^* = 4.0$ $\theta_{lip} = 25^\circ$	Air	1.202	228.9	1611.4	Taps 34, 42 bad
420			0.905	226.2	1629.4	
421			0.907	225.1	1312.7	
422			0.904	217.3	899.5	
423			0.900	219.6	477.1	
425			0.905	63.3	1021.5	
430			1.204	52.3	997.6	
433			1.477	67.3	1068.8	
438†			3.480	114.5	1050.0	
440†			3.480	358.5	456.1	
441†			3.480	360.2	924.9	
442†			3.480	361.5	1229.8	
443†			3.480	368.1	1639.0	
444†			1.469	398.8	1605.1	
445			1.464	395.8	1324.3	
446			1.464	431.2	923.1	
447†			1.449	447.5	307.4	
448†			1.205	339.9	394.0	
449			1.200	384.1	906.9	
450†			1.197	418.5	1327.6	
451†			1.193	412.5	1492.3	
452†			0.902	374.0	1631.4	
453			0.878	355.4	1317.9	
454			0.895	374.3	836.6	
455†			0.899	355.6	488.0	
457			0.893	541.5	933.1	
459			0.900	550.0	1631.4	
460			1.204	543.1	1633.6	
462			1.212	516.4	887.3	
465	Triple $A/A^* = 4.0$ $\theta_{lip} = 25^\circ$		1.466	527.1	1637.5	
467			1.466	523.0	901.5	
468†			3.480	518.8	1650.3	

†Schlieren photograph taken.

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Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M _∞	T _c (°F)	P _c (psia)	Comments
469 [†]	Triple A/A* = 4.0 θ _{lip} = 25°	Air	3.480	527.1	1280.0	Taps 34, 42 bad ↓ Jet Off Runs ↓
470 [†]			3.480	510.7	813.9	
471 [†]			3.480	467.2	385.0	
472			0.903			
473			1.199			
474	Single A/A* = 8.0 θ _{lip} = 15°	CF ₄	1.466			Air Calibration Runs ↓ CF ₄ Calibration Runs ↓ Taps 13, 34, 41 bad ↓
475 [†]			3.480			
501 [†]			0	477.	486.	
502 [†]			0	506.	954.	
503 [†]			0	495.	1320.	
504 [†]			0	516.	1701.	
505 [†]			0	537.	1960.	
506 [†]			0	468.	548.	
507 [†]			0	508.	987.	
508 [†]			0	432.	1482.	
509 [†]			0	513.	1897.	
511 [†]			0	170.	2020.	
512 [†]			0	106.	1574.	
513 [†]			0	179.	1100.	
514 [†]			0	140.	570.	
515 [†]			3.480	243.6	1170.8	
516			1.468	240.3	1133.6	
517			1.213	233.7	1213.7	
518			0.909	235.2	1219.2	
519			0.904	315.0	1137.9	
520	1.204	310.7	1135.6			
521 [†]	1.468	308.8	1141.5			
522 [†]	3.480	294.2	1147.9			
523 [†]	3.480	343.3	425.6			
524 [†]	Single A/A* = 8.0 θ _{lip} = 15°	CF ₄	3.480	453.1	794.9	
525 [†]			3.480	380.9	1234.6	
526 [†]			3.480	384.2	1545.7	
527 [†]			3.480	373.1	1809.3	

[†]Schlieren photograph taken.

Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M_∞	T_c (°F)	P_c (psia)	Comments
528 [†]	Single $A/A^* = 8.0$ $\theta_{lip} = 15^\circ$	CF ₄	1.484	417.2	1857.2	Taps 34 and 41 bad
529			1.482	417.3	1542.9	
530			1.467	406.3	1144.0	
531			1.459	400.1	843.9	
532			1.444	350.2	496.7	
533			1.195	384.3	508.7	
534			1.202	402.3	859.7	
535			1.204	403.9	865.1	
536			1.198	428.4	1562.3	
537 [†]			1.202	425.3	1916.9	
538 [†]			0.901	420.9	1883.3	Taps 13, 34, 41 bad Taps 13, 34, 41 bad Taps 34, 41 bad
539			0.906	424.1	1572.2	
540			0.904	407.6	1189.6	
541			0.894	400.9	851.1	
542			0.899	210.6	480.8	
546 [†]			3.480	446.9	1194.2	
547 [†]			3.480	566.1	1220.4	
548			1.473	543.4	1253.7	
549			1.204	537.5	1233.4	
550			0.893	542.8	1229.5	
551	Single $A/A^* = 8.0$ $\theta_{lip} = 15^\circ$		0.898			Jet Off Runs Calibration Data Points
552			1.195			
553			1.456			
554 [†]			3.480			
601 [†]			0.0	130.	1080.	
602 [†]			0.0	350.	980.	
603 [†]			0.0	475.	563.	
604 [†]			0.0	537.	1076.	
605 [†]			0.0	557.	1473.	
606 [†]			0.0	557.	1760.	
607	Triple $A/A^* = 8.0$ $\theta_{lip} = 15^\circ$	CF ₄	0.906	294.8	1504.1	Taps 13, 20, 28 bad
608			1.212	335.8	1583.2	
609			1.457	150.8	1259.7	

[†]Schlieren photograph taken.

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Table 11 (Continued)

Run Number	Nozzle Configuration	Test Gas	M_∞	T_c (°F)	P_c (psia)	Comments
610	Triple $A/A^* = 8.0$ $\theta_{lip} = 15^\circ$	CF_4	3.480	337.0	1518.2	Taps 13, 20, 28 bad
611†			3.480	464.8	1467.8	
612			1.462	553.4	1211.2	
615			0.894	379.6	832.1	
616			0.901	388.7	1147.0	
617			0.901	410.7	1544.3	
618			0.901	410.4	1872.5	
619			1.210	377.0	1885.9	
620			1.202	407.4	1550.8	
621			1.201	397.3	1230.7	
622			1.193	388.3	822.3	
623			1.453	391.3	859.5	
624			1.459	380.8	1216.7	
625			1.467	384.0	1565.6	
626			1.476	388.6	1921.2	
627†			3.480	395.3	1803.1	
628†			3.480	397.2	1472.0	
629†			3.480	382.4	1181.3	
630†			3.480	399.0	815.8	
631†			3.480	552.6	1618.9	
632			1.461	526.9	1120.7	
633			1.193	569.1	1608.6	
634			0.902	571.0	1610.3	
635	Triple $A/A^* = 8.0$ $\theta_{lip} = 15^\circ$	CF_4	0.906			Jet Off Runs
636			1.199			
637†	Single $A/A^* = 3.5$ $\theta_{lip} = 35^\circ$	Air	1.454			Taps 40, 42 bad
638†			3.480			
701†			3.480	51.3	968.8	
702†			3.480	278.1	440.5	
703†	Single $A/A^* = 3.5$ $\theta_{lip} = 35^\circ$	Air	3.480	274.7	854.8	Taps 40, 42 bad
704†			3.480	231.4	1244.7	

†Schlieren photograph taken.

Table 11 (Concluded)

Run Number	Nozzle Configuration	Test Gas	M_{∞}	T_c (°F)	P_c (psia)	Comments
705†	Single $A/A^* = 3.5$ $\theta_{lip} = 35^\circ$ ↓ Single $A/A^* = 3.5$ $\theta_{lip} = 35^\circ$	Air ↓ Air	3.480	231.6	1561.3	Taps 40, 42 bad ↓
706†			3.480	405.5	1548.5	
707†			3.480	394.8	1248.8	
708†			3.480	381.0	724.2	
709†			3.480	357.4	433.8	
710†			3.480	525.0	845.0	
711†			3.480	529.8	1553.7	
712†			3.480	83.4	530.9	
713†			3.480	42.3	1370.8	
714†			3.480	63.7	1548.0	
715†			3.480	537.5	1243.3	

†Schlieren photograph taken.

⊙ = Space Shuttle Main Engine

△ = CF₄ $\left\{ \begin{array}{l} P_c = 2000 \text{ psia} \\ T_c = 760^\circ\text{R} \end{array} \right.$

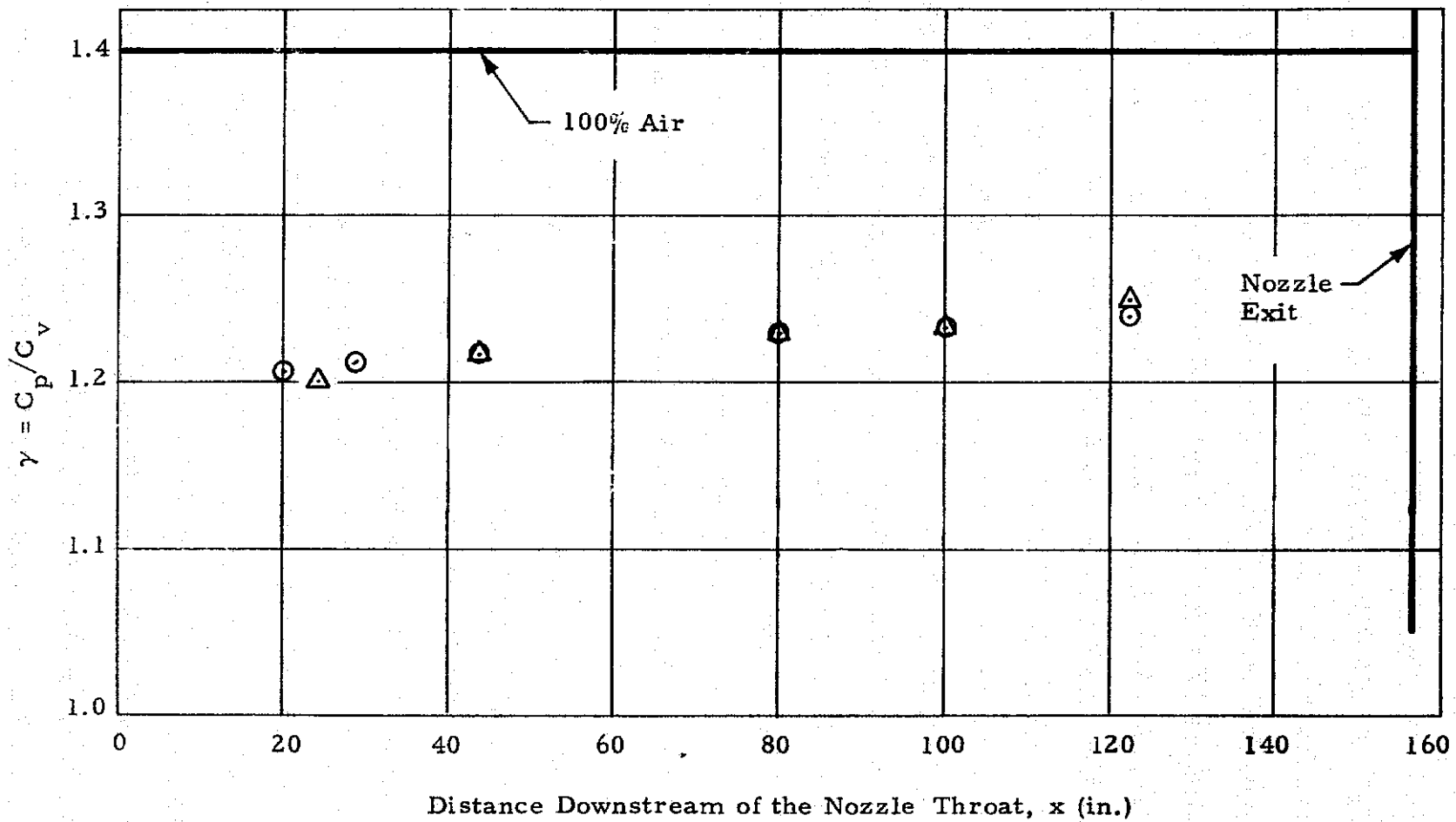


Fig. 1 - Variation of the Ratio of Specific Heats for a Typical Booster

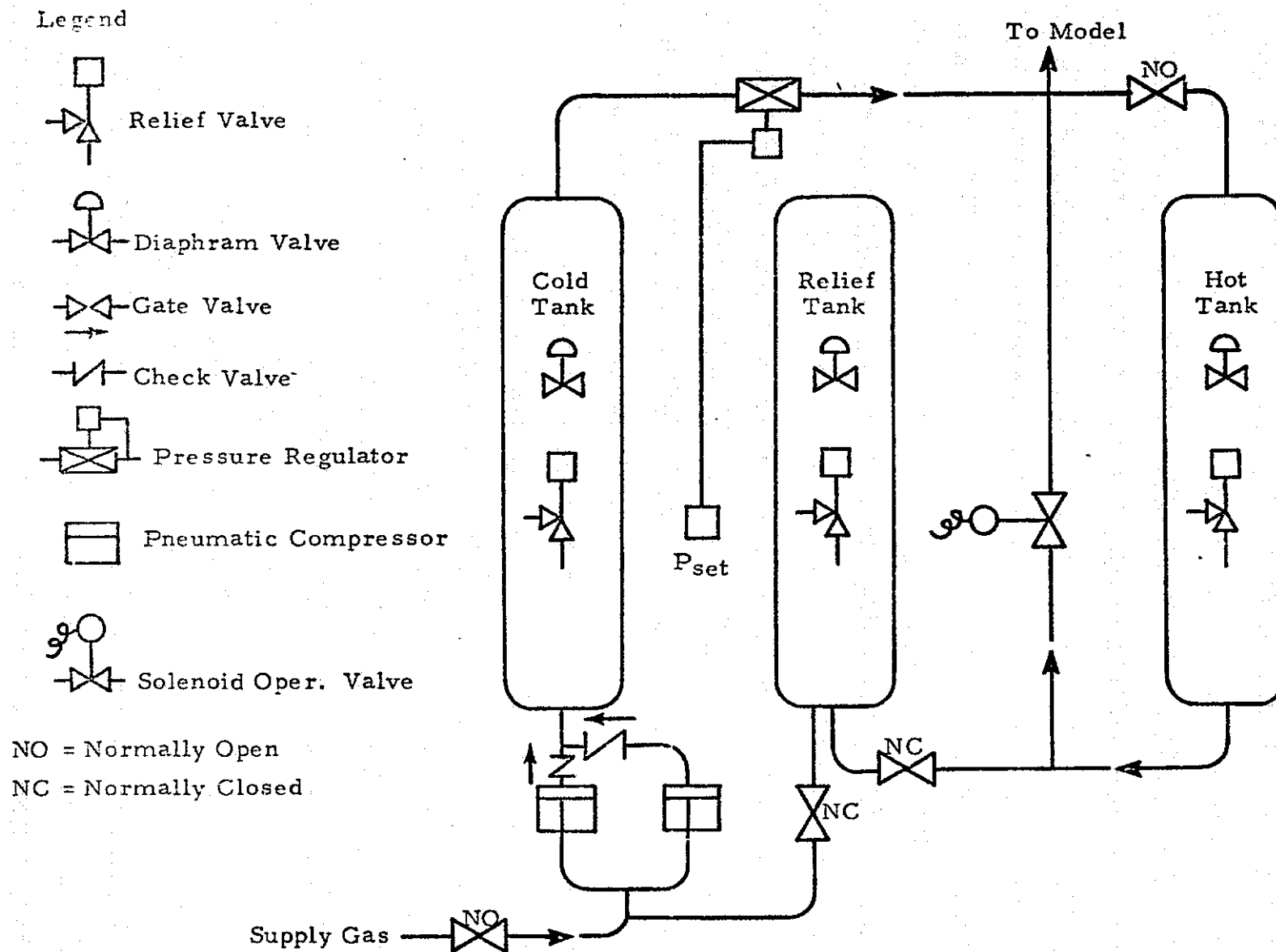


Fig. 2 - Schematic of NASA-MSFC Gas Heater

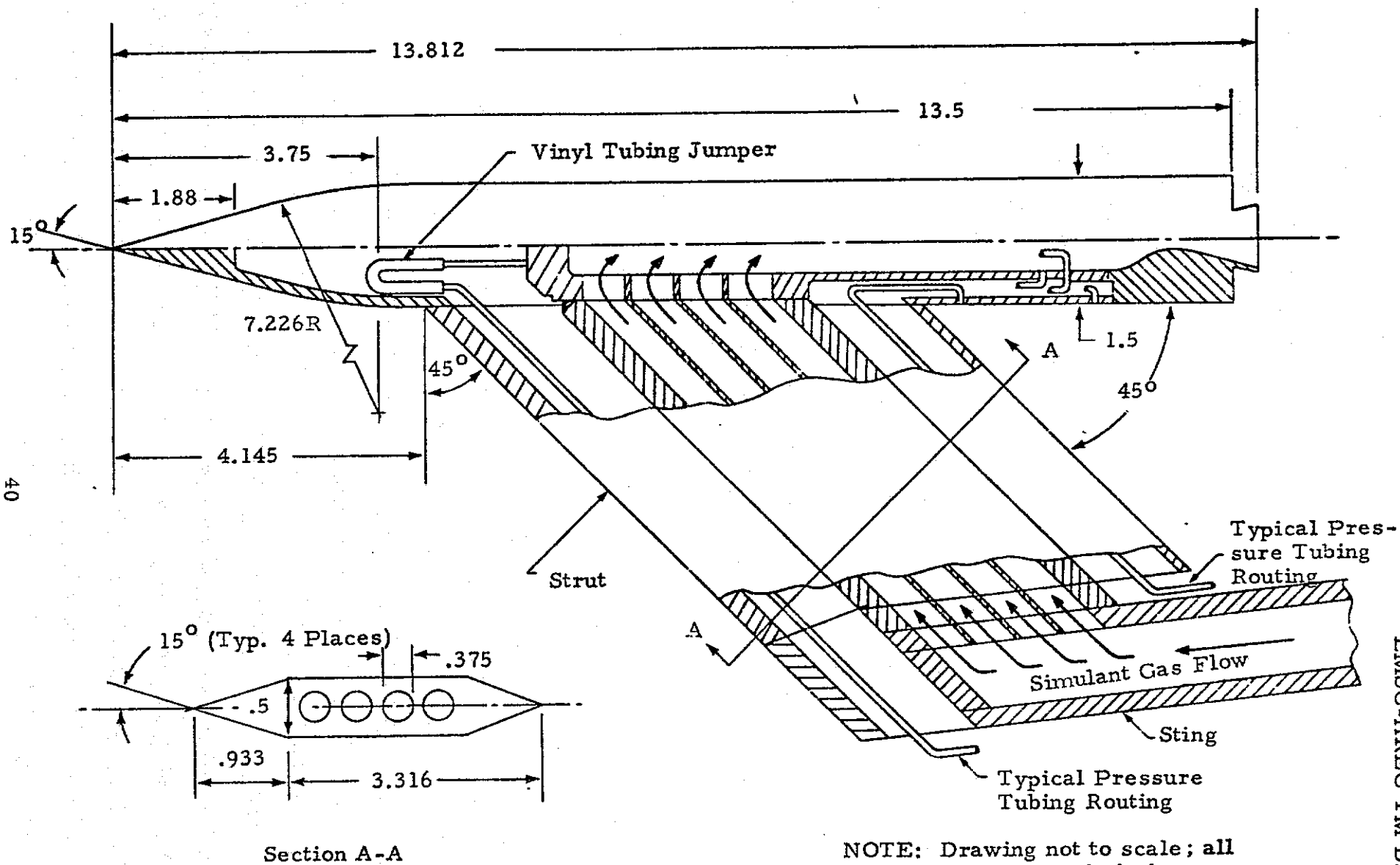


Fig. 3 - Plume Technology Model

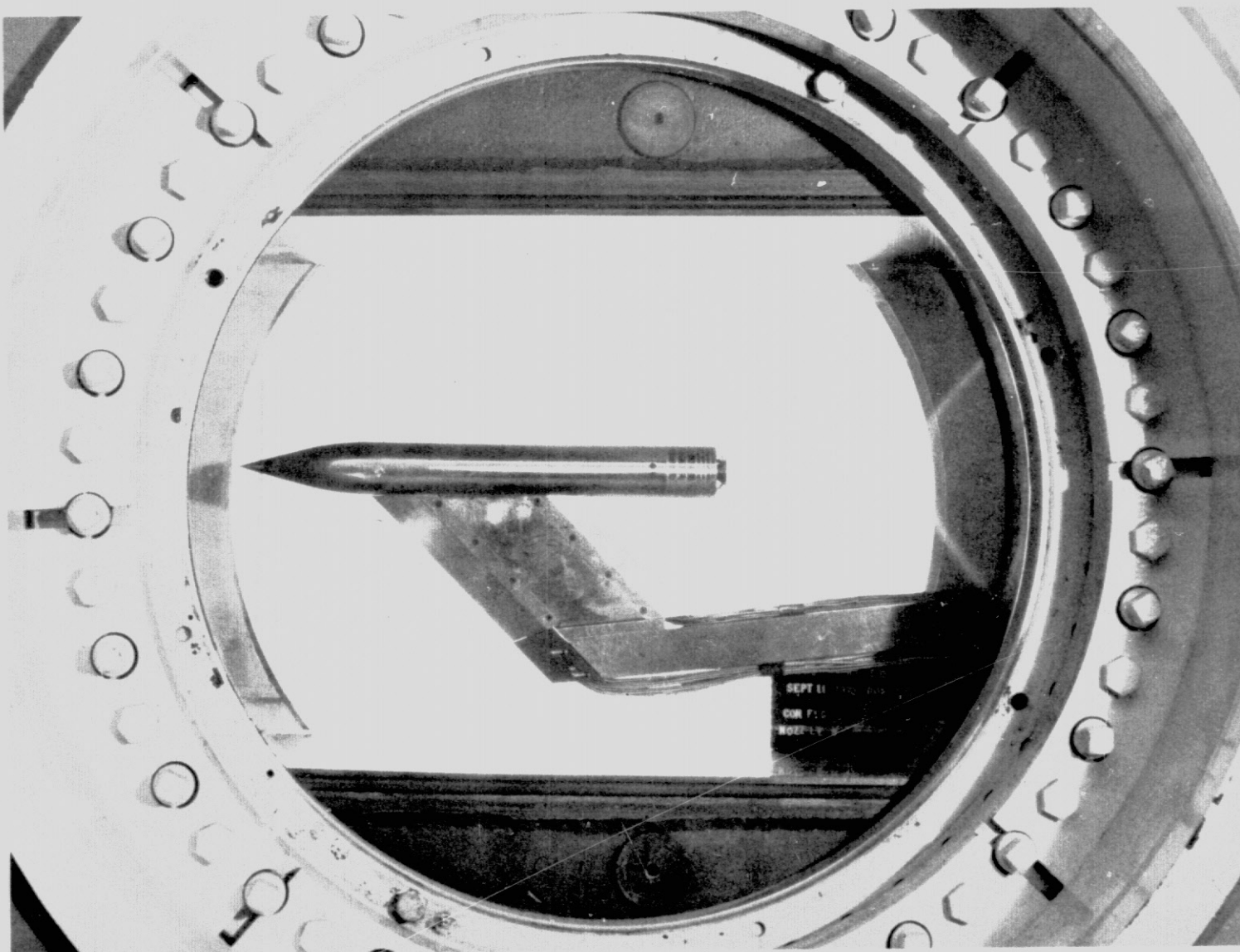


Fig. 4 - Cone-Ogive-Cylinder Model Installed in the Supersonic Test Section

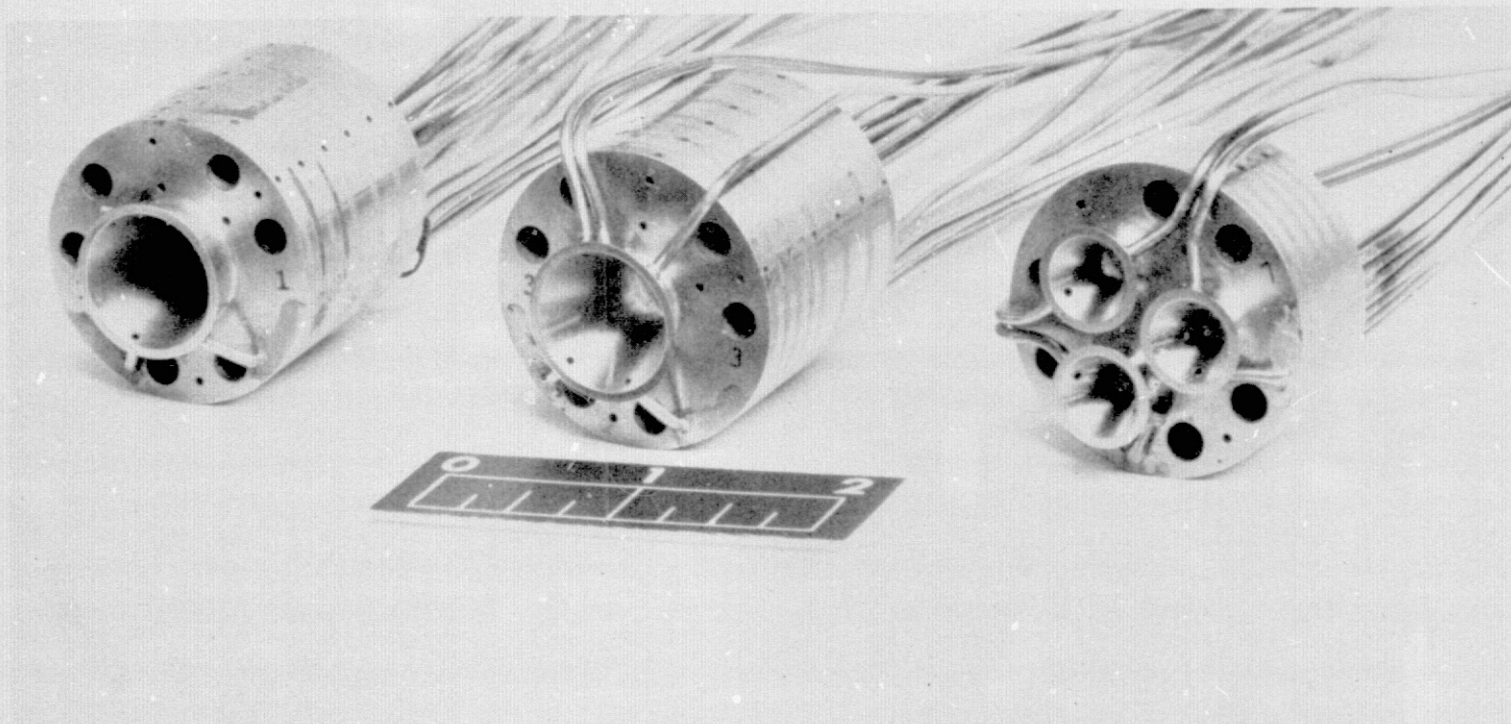


Fig. 5 - Typical Single and Triple Nozzle Configurations

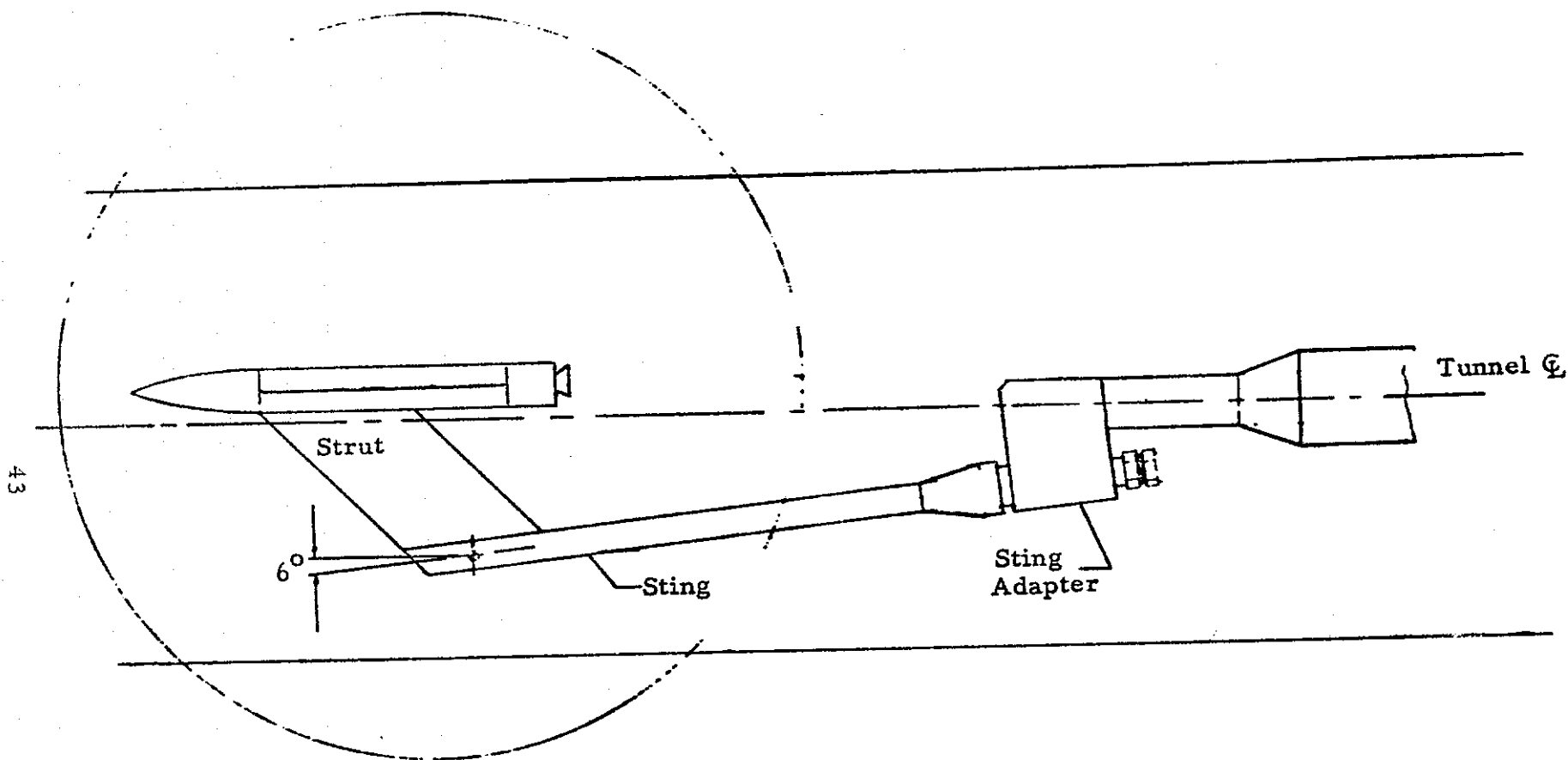
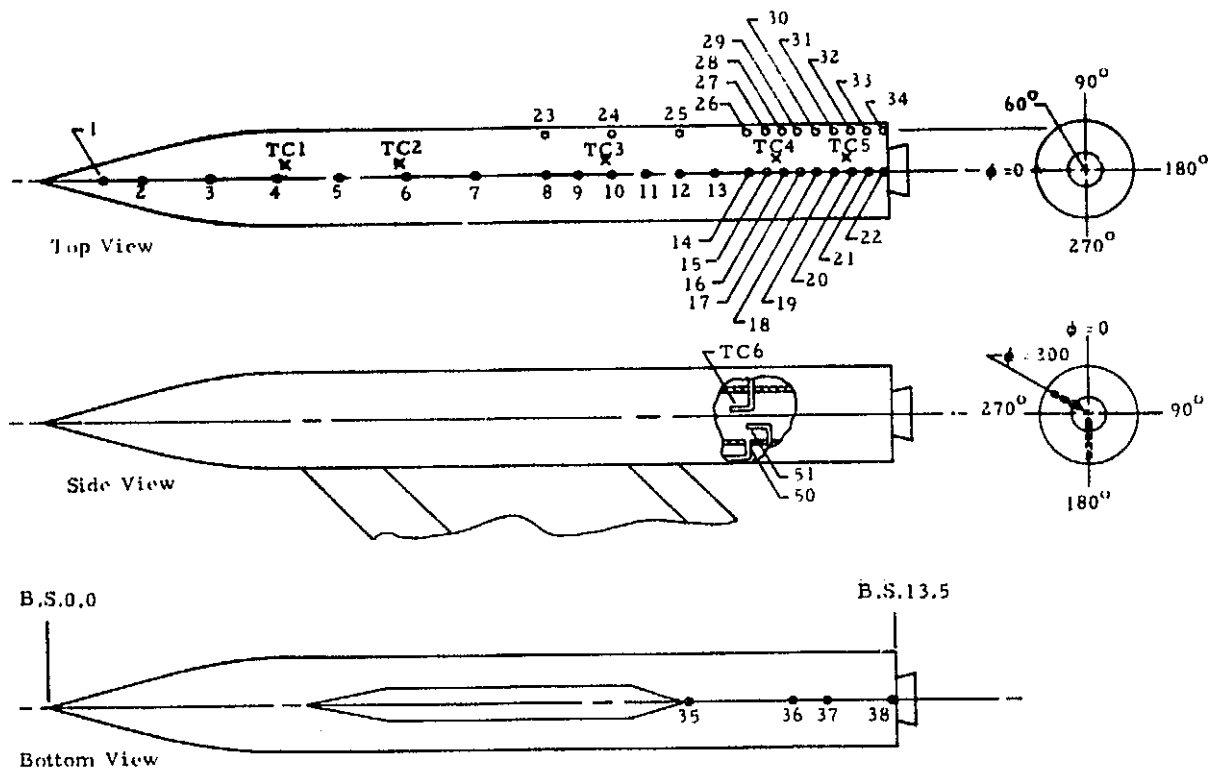


Fig. 6 - Plume Technology Model Installed in the MSFC 14-Inch Trisonic Wind Tunnel



a. Model Surface and Chamber Pressure Orifice and Thermocouple Locations

Model Surface Pressure Orifice Locations		
Orifice No.	Body Station (in.)	Angular Orientation ϕ (deg)
1	1.011	0
2	1.631	
3	2.700	
4	3.778	
5	4.809	
6	5.880	
7	6.959	
8	8.038	
9	8.582	
10	9.119	
11	9.663	
12	10.202	
13	10.743	
14	11.284	
15	11.555	
16	11.824	
17	12.094	
18	12.363	
19	12.631	0

Model Surface Pressure Orifice Locations		
Orifice No.	Body Station (in.)	Angular Orientation ϕ (deg)
20	12.904	0
21	13.172	0
22	13.443	0
23	8.043	60
24	9.125	
25	10.205	
26	11.283	
27	11.554	
28	11.825	
29	12.096	
30	12.366	
31	12.636	
32	12.906	
33	13.176	
34	13.446	60
35	10.206	180
36	11.826	
37	12.366	
38	13.466	180

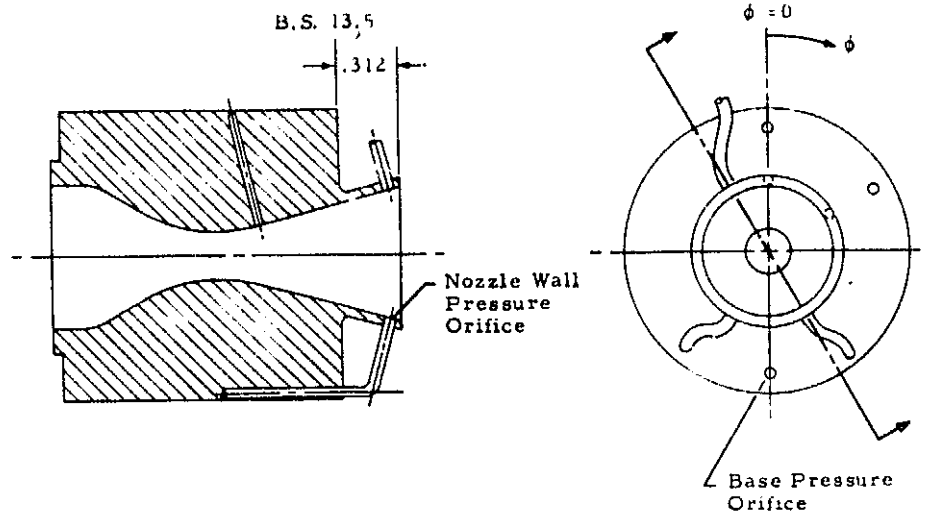
Model Surface Temperature Thermocouple Locations

No.	Body Station (in.)	Angular Orientation ϕ (deg)
TC1	3.9	15
TC2	5.8	15
TC3	9.1	15
TC4	11.7	15
TC5	12.8	15

Model Chamber Pressure and Temperature Instrumentation Location

Type	No.	Body Station (in.)	Angular Orientation ϕ (deg)
Static Pressure	50	11.188	180
Total Pressure	51	11.188	180
Total Temperature	TC6	10.938	300

Fig. 7 - Plume Technology Model Pressure Orifice and Thermocouple Locations



b. Single Nozzle Wall and Model Base Pressure Orifice Locations

Single Nozzle Wall Pressure Orifice Locations

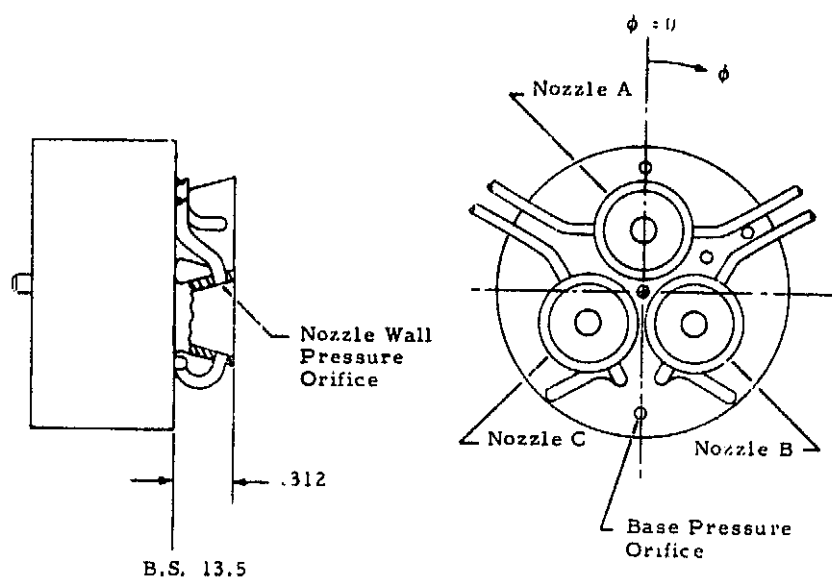
Nozzle Config.	Gas	Orifice No.	Dist. from Throat (in.)	Angular Orientation ϕ (deg)
$A/A^* = 6.5$ $\theta_{lip} = 35^\circ$	Air	44*	0.327	330
		45*	0.429	330
		46	0.430	150
		47	0.430	210
		48*	0.379	30
$A/A^* = 3.5$ $\theta_{lip} = 35^\circ$	Air	46	0.241	150
		47	0.241	210
$A/A^* = 3.5$ $\theta_{lip} = 25^\circ$	Air	44*	0.348	330
		45*	0.467	330
		46	0.471	150
		47	0.471	210
		48*	0.407	30
$A/A^* = 8.0$ $\theta_{lip} = 15^\circ$	CF ₄	44*	0.259	335
		45*	0.934	330
		46	0.936	150
		47	0.934	210
		48*	0.588	30

* Tube routed outside the nozzle.

Model Base Pressure Orifice Locations for All Single Nozzles

Orifice No.	Body Station (in.)	Radius (in.)	Angular Orientation (deg)
39	13.499	0.63	0
40		0.39	0
41		0.63	60
42		0.39	60
43	13.499	0.63	180

Fig. 7 - (Continued)



B.S. 13.5

c. Triple Nozzle Wall and Model Base Pressure Orifice Locations

Triple Nozzle Wall Pressure Orifice Locations

Nozzle Config.	Gas	Orifice No.	Nozzle	Dist. from Throat (in.)	Angular Orientation ϕ (deg)
$A/A^* = 4.0$ $\theta_{lip} = 25^\circ$	Air	44*	A	0.269	270
		45*	A	0.268	90
		46*	B	0.275	30
		47	B	0.275	210
		48	C	0.281	150
		49*	C	0.281	330
$A/A^* = 8.0$ $\theta_{lip} = 15^\circ$	CF_4	44*	A	0.465	270
		45*	A	0.463	90
		46*	B	0.461	30
		47	B	0.461	210
		48	C	0.468	150
		49*	C	0.469	330

* Tube routed outside the nozzle.

Model Base Pressure Orifice Locations for All Triple Nozzles

Orifice No.	Body Station (in.)	Radius (in.)	Angular Orientation (deg)
39	13.499	0.63	0
40		0.0	0
41		0.64	60
42		0.40	60
43		0.64	180

Fig. 7 - (Concluded)

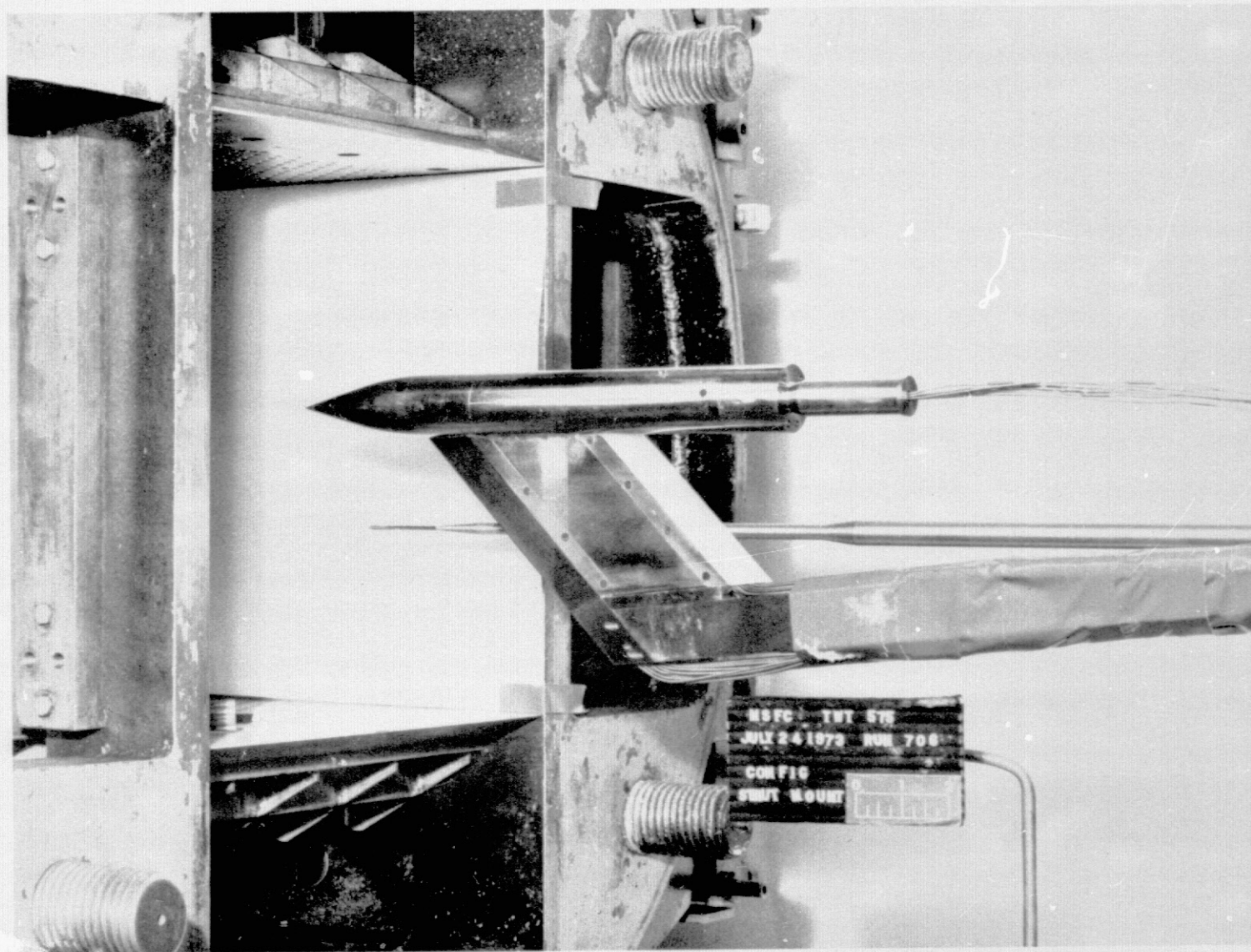


Fig. 8 - Strut-Mounted Model Installation Showing Afterbody Extension for Attaching Solid Plumes

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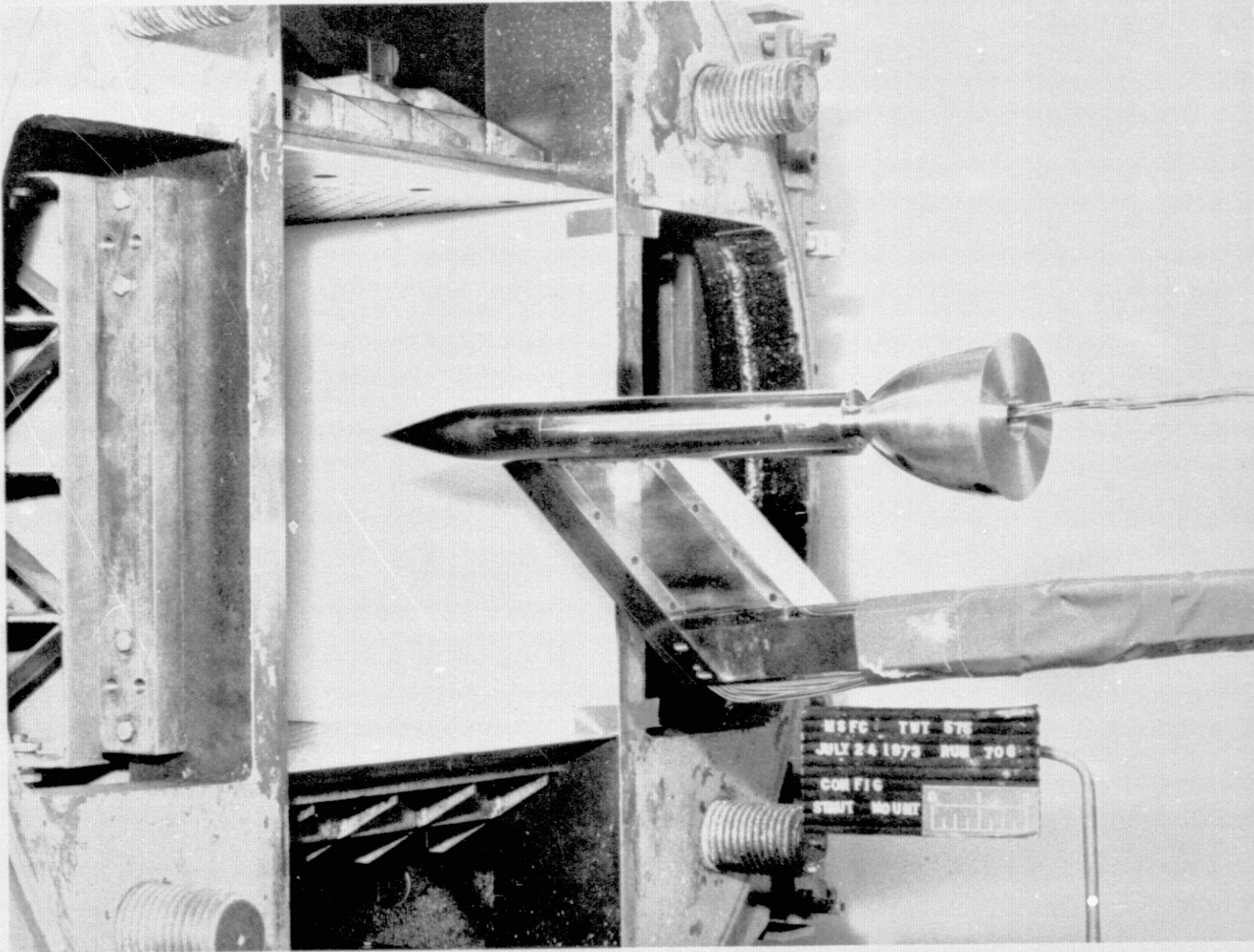


Fig. 9 - Strut-Mounted Model with Solid Plume Installed

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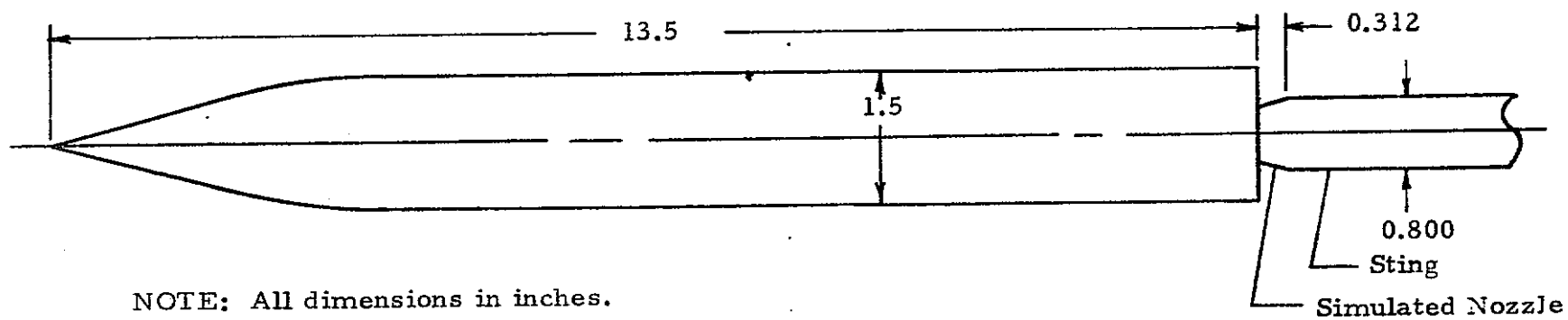
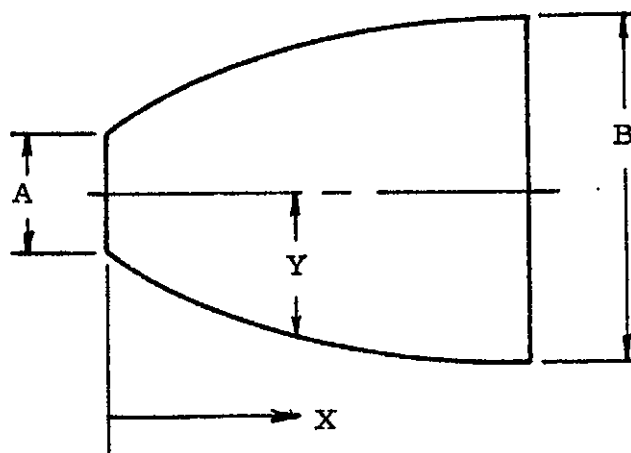


Fig. 10 - Sting-Mounted Model Schematic



Plume 1		Plume 2	
A = 0.800	B = 2.330	A = 0.800	B = 3.640
X	Y	X	Y
0.000	0.400	0.000	0.400
0.400	0.670	0.400	0.761
0.800	0.855	0.800	1.020
1.200	0.982	1.200	1.230
1.600	1.080	1.600	1.400
2.000	1.140	2.000	1.540
2.400	1.159	2.400	1.640
2.800	1.167	2.800	1.720
		3.200	1.780
		3.600	1.820

NOTE: All dimensions in inches.

Fig. 11 - Solid Plume Geometry

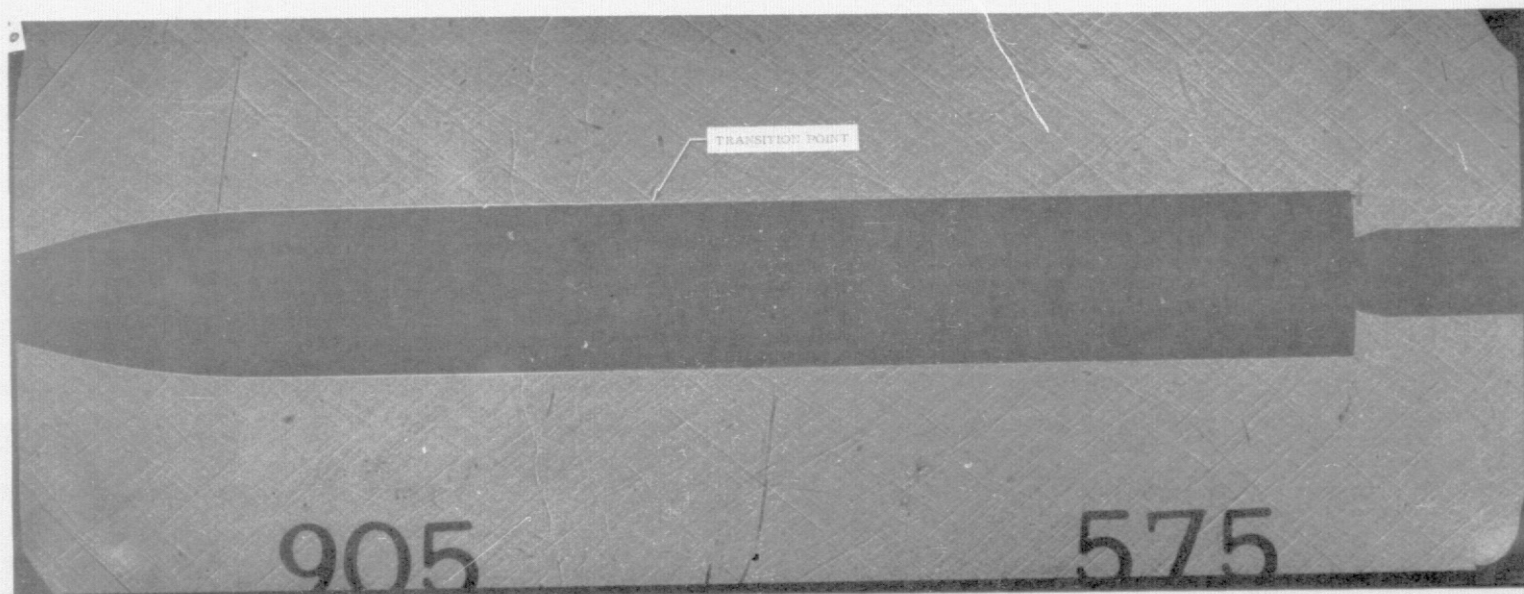


Fig. 12 - Shadowgraph of Boundary Layer Transition Without Grit at Mach 1.46

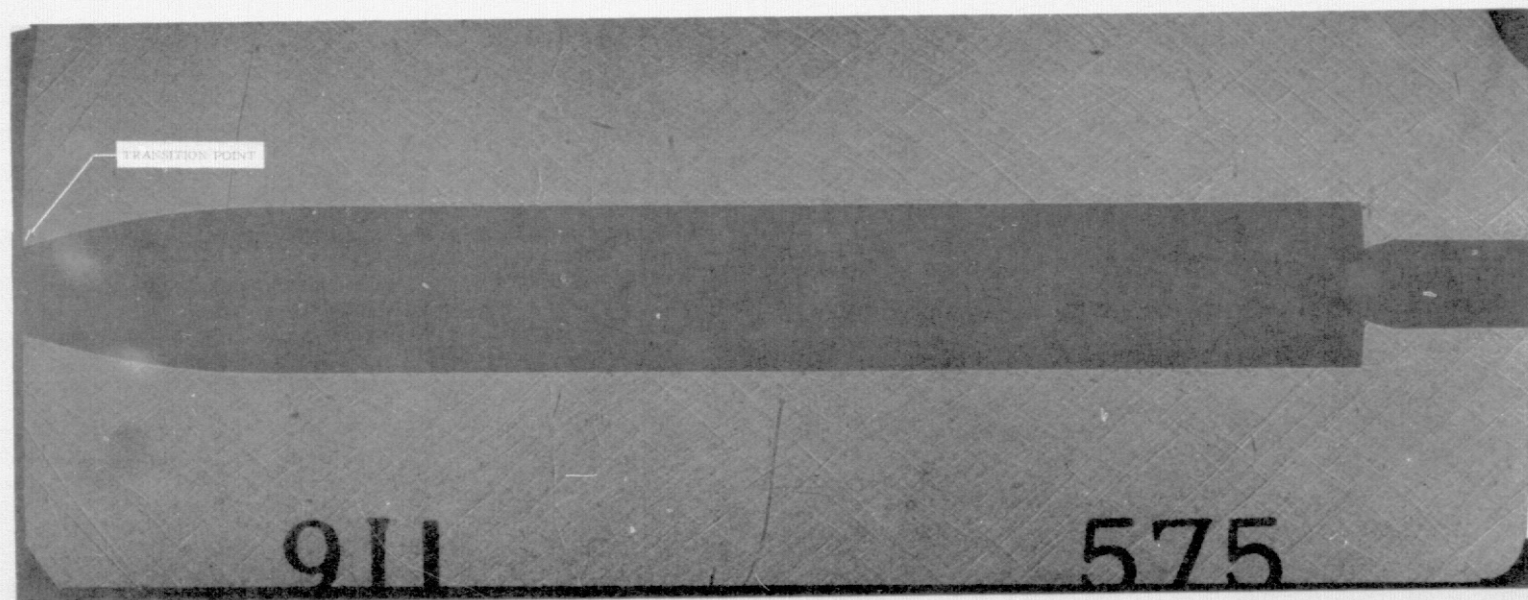


Fig. 13 - Shadowgraph of Boundary Layer Transition with No. 60 Grit at $M = 1.46$

Local Model Static to Freestream Static Pressure Ratio, p_m/p_∞

Symbol	Configuration	Solid Plume	ϕ (deg)	Wall	M_∞
○	Strut	None	0	Porous	0.9
□	Sting	None	0	Porous	0.9

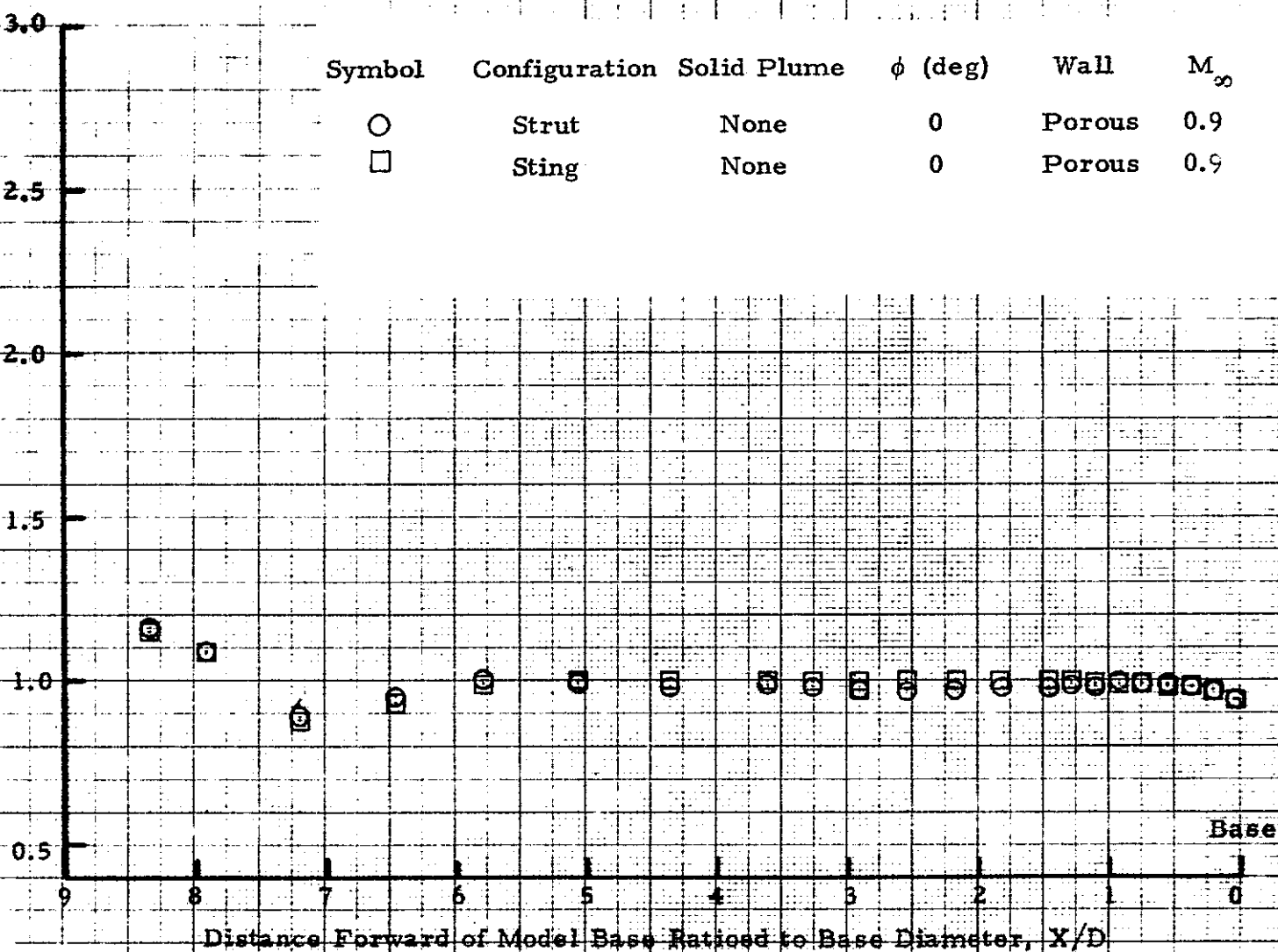


Fig. 14 - Model Surface Pressure Distribution, Strut-Sting Comparison, $M_\infty = 0.9$

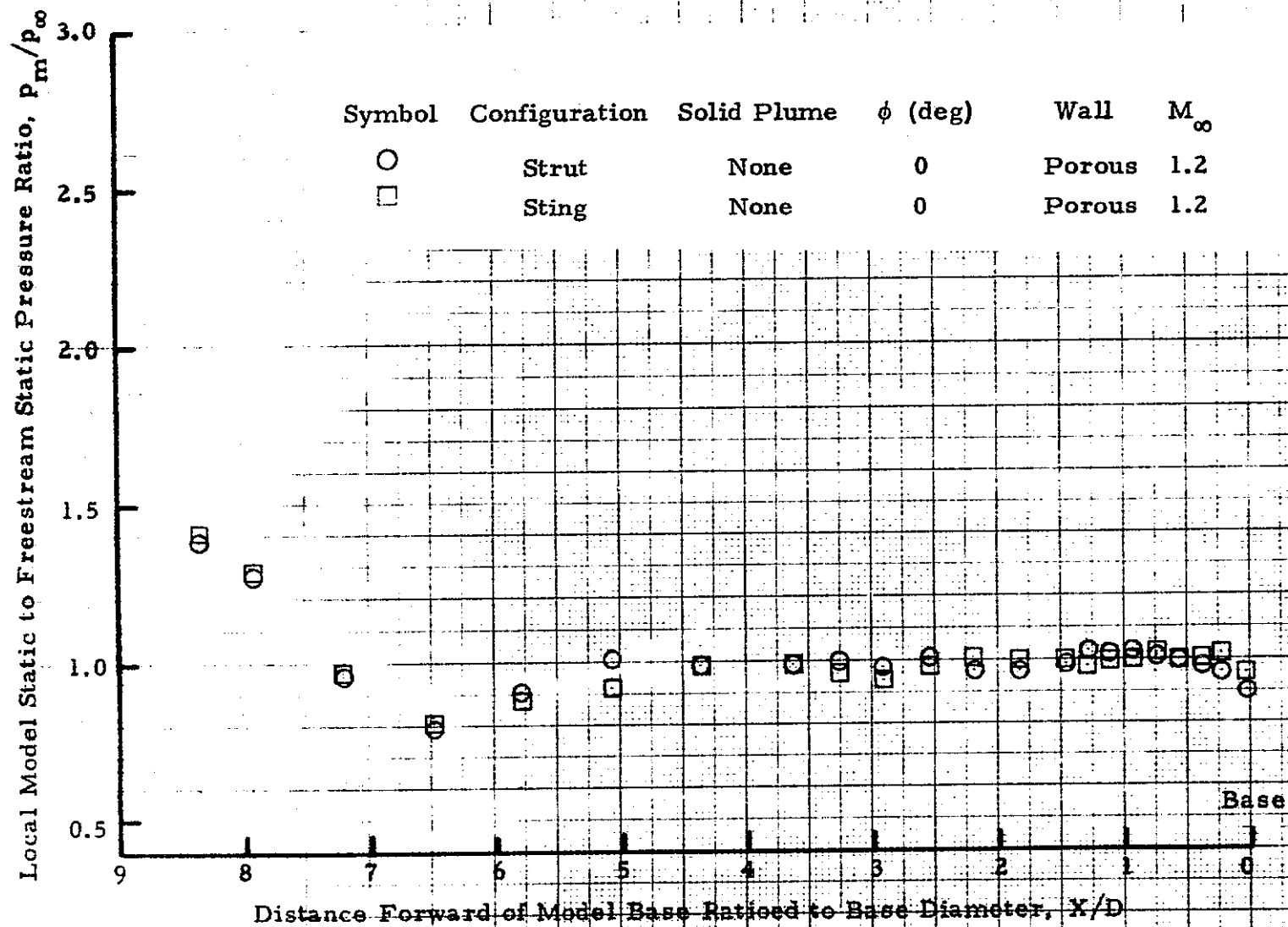


Fig. 15 - Model Surface Pressure Distribution, Strut-Sting Comparison, $M_\infty = 1.2$

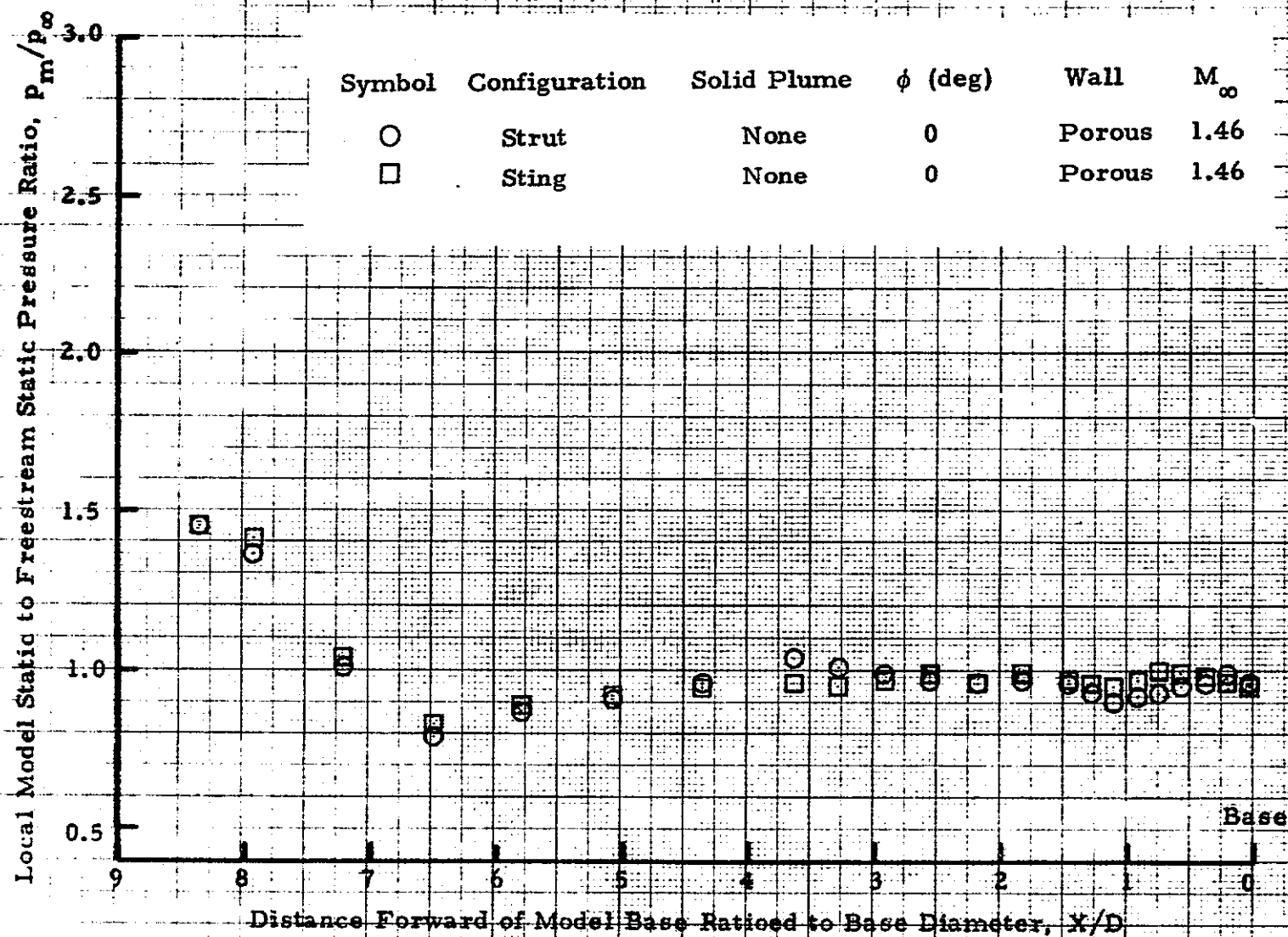


Fig. 16 - Model Surface Pressure Distribution, Strut-Sting Comparison, $M_\infty = 1.46$

Local Model Static to Freestream Static Pressure Ratio, p/p_∞

3.0
2.5
2.0
1.5
1.0
0.5

Symbol	Configuration	Solid Plume	ϕ (deg)	Wall	M_∞
○	Strut	None	0	Glass	3.48
□	Sting	None	0	Glass	3.48

Distance Forward of Model Base Ratioed to Base Diameter, X/D

Base

Fig. 17 - Model Surface Pressure Distribution, Strut-Sting Comparison, $M_\infty = 3.48$

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Local Model Static to Freestream Static Pressure Ratio, p_m/p_∞

Symbol	Configuration	Solid Plume	ϕ (deg)	Wall	M_∞
○	Strut	None	0	Porous	0.9
□	Strut	None	60	Porous	0.9
△	Strut	None	180	Porous	0.9

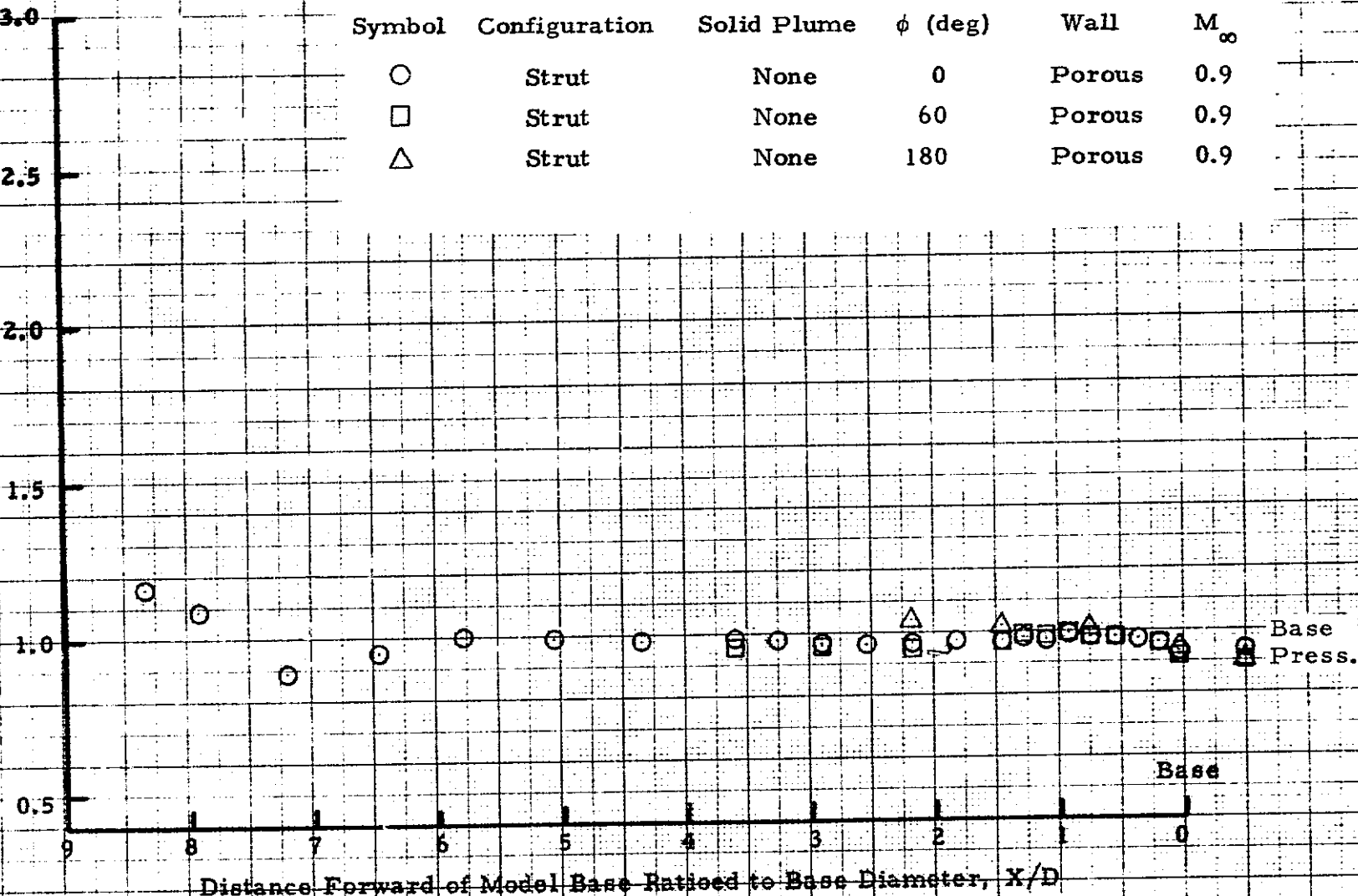


Fig. 18 - Model Surface Pressure Distribution, Radial Pressure Profiles, $M_\infty = 0.9$

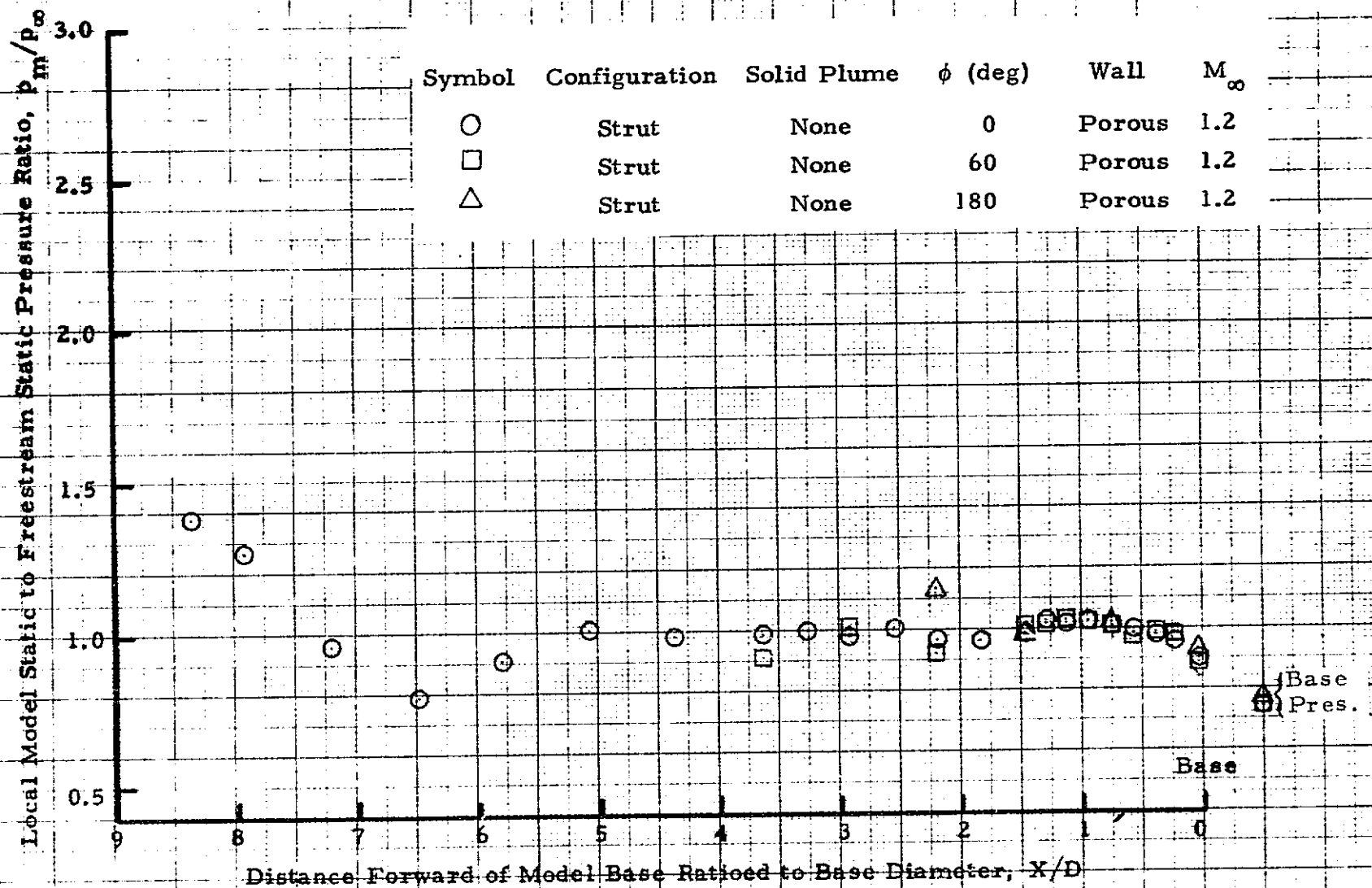


Fig. 19 - Model Surface Pressure Distribution, Radial Pressure Profiles, $M_\infty = 1.2$

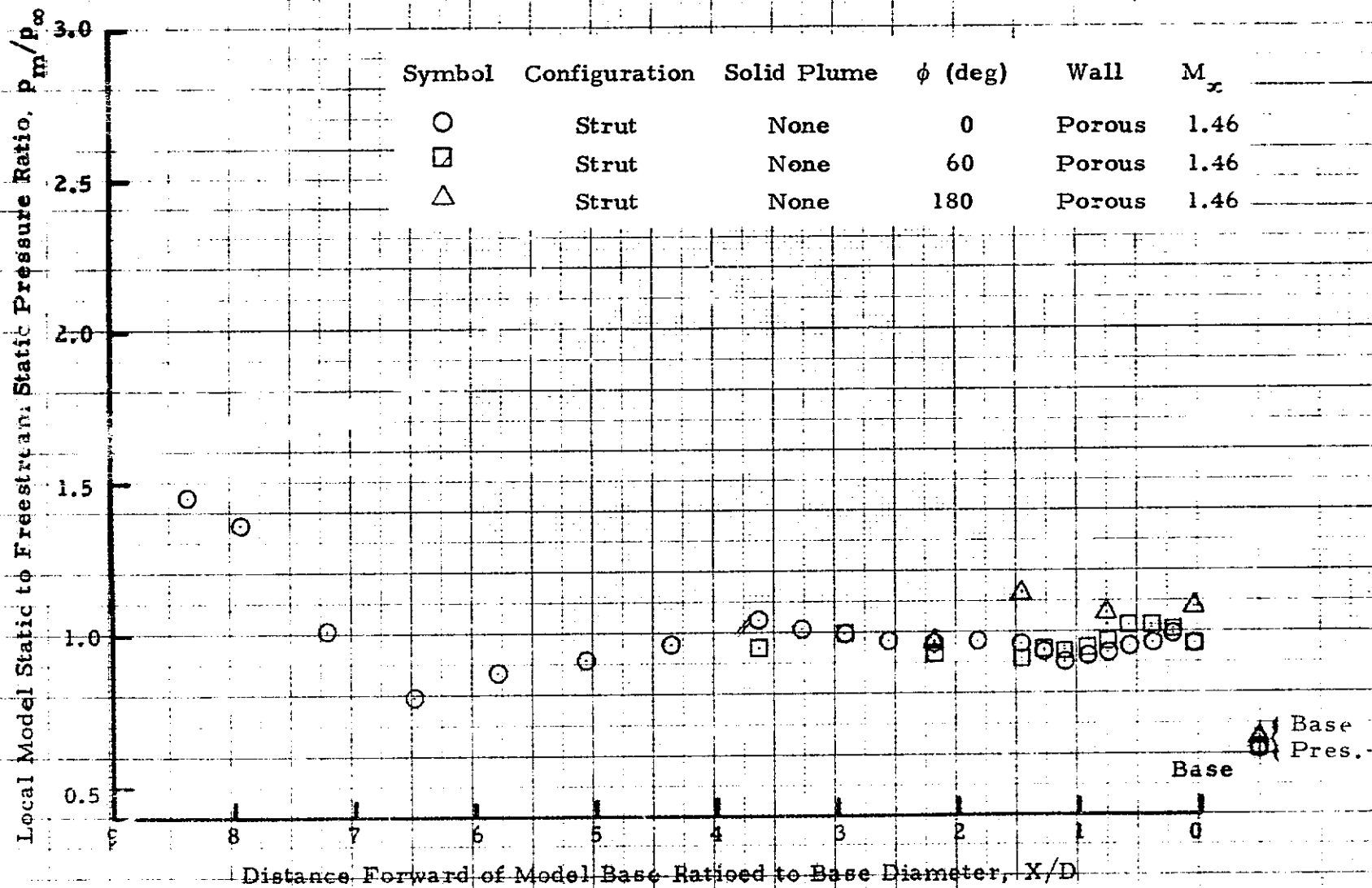


Fig. 20 - Model Surface Pressure Distribution, Radial Pressure Profiles, $M_\infty = 1.46$

Local Model Static to Freestream Static Pressure Ratio, p/p_∞

3.0
2.5
2.0
1.5
1.0
0.5

Symbol	Configuration	Solid Plume	ϕ (deg)	Wall	M_∞
○	Strut	None	0	Glass	3.48
□	Strut	None	60	Glass	3.48
△	Strut	None	180	Glass	3.48

Distance Forward of Model Base Ratified to Base Diameter, X/D

Base

Base
Pres.

Fig. 21 - Model Surface Pressure Distribution, Radial Pressure Profiles, $M_\infty = 3.48$

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Base

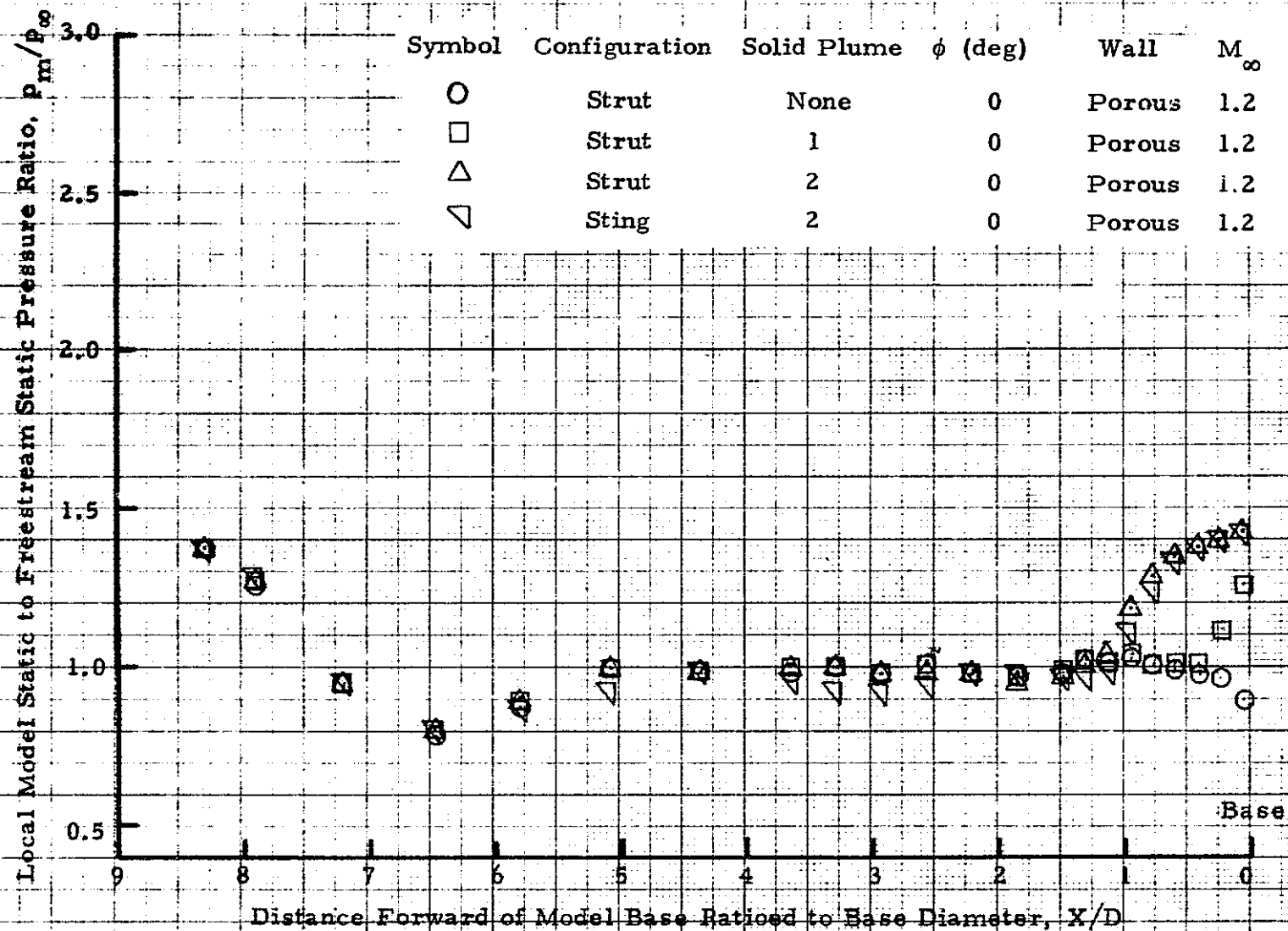


Fig. 23 - Model Surface Pressure Distribution, Solid Plume Effects, $M_\infty = 1.2$

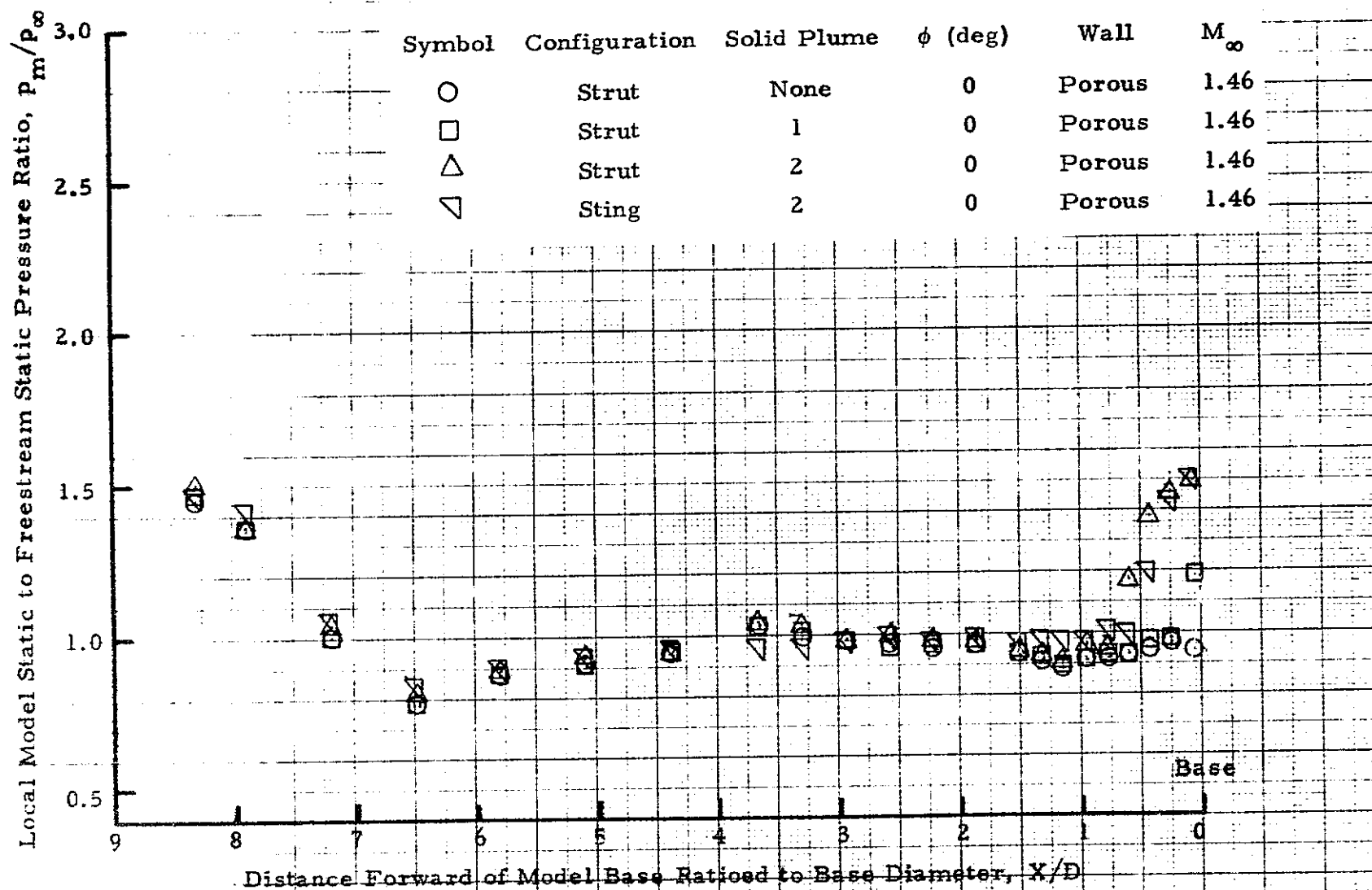


Fig. 24 - Model Surface Pressure Distribution, Solid Plume Effects, $M_\infty = 1.46$

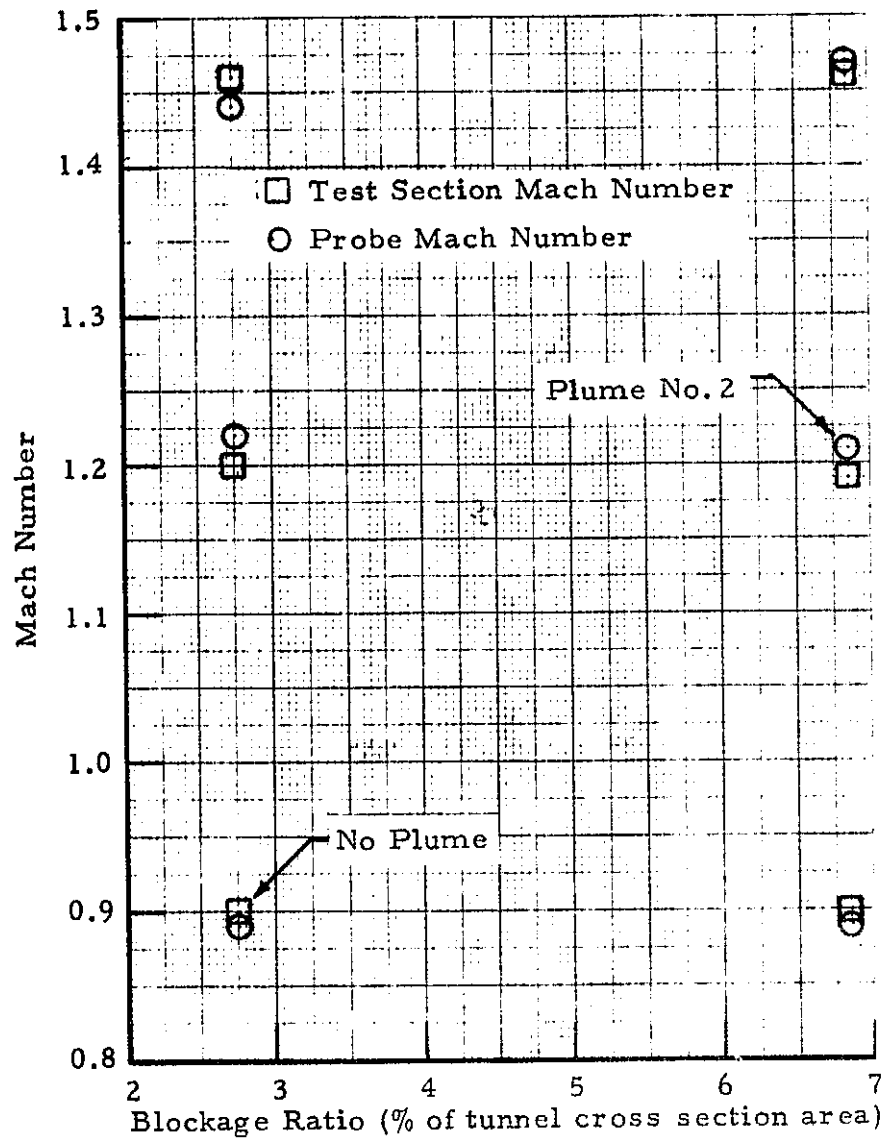


Fig. 25 - Comparison of Probe and Test Section Mach Numbers for the Strut Model with No Plume and Plume Number 2

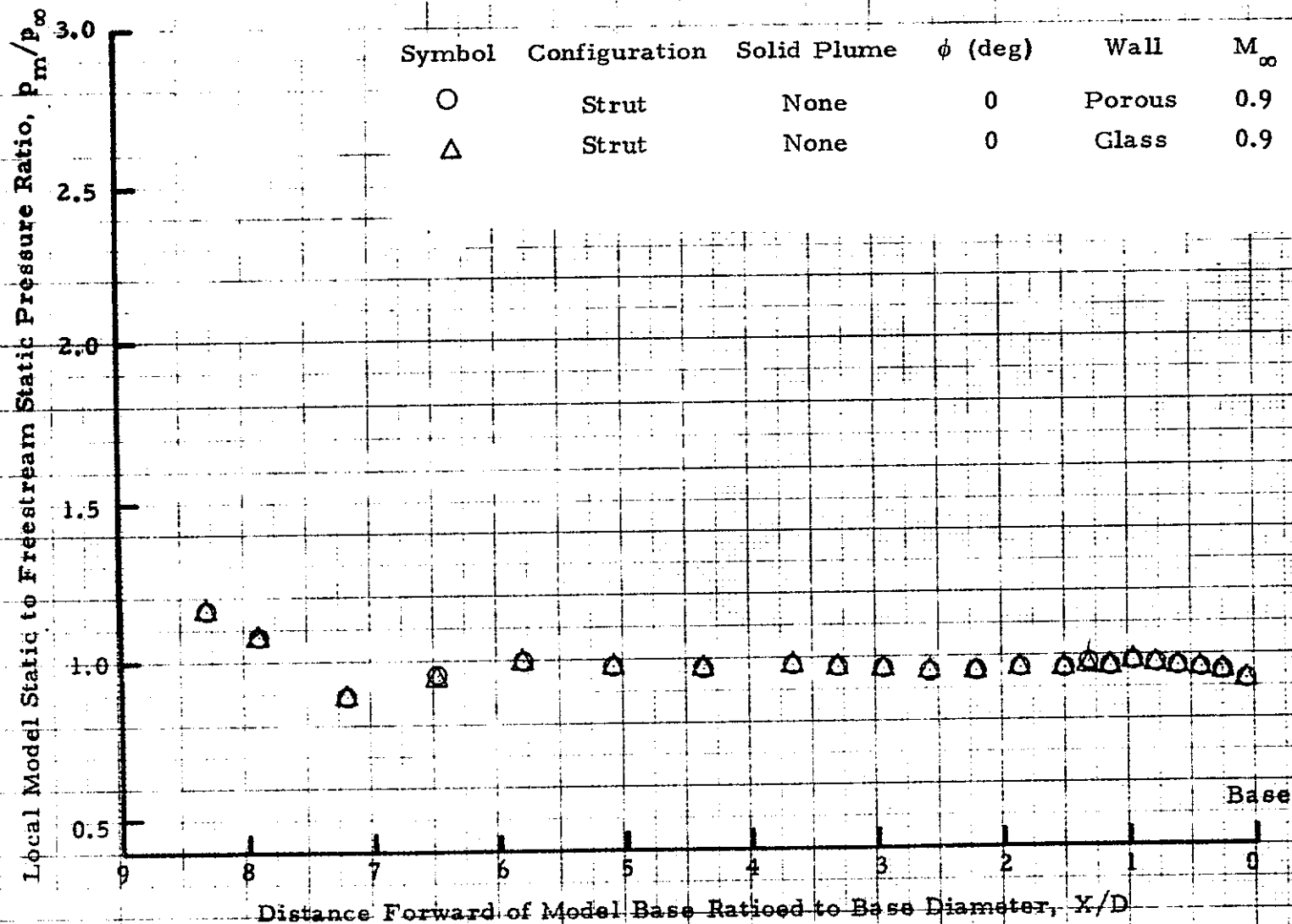


Fig. 26 - Model Surface Pressure Distribution, Wall Interference Effects, $M_\infty = 0.9$

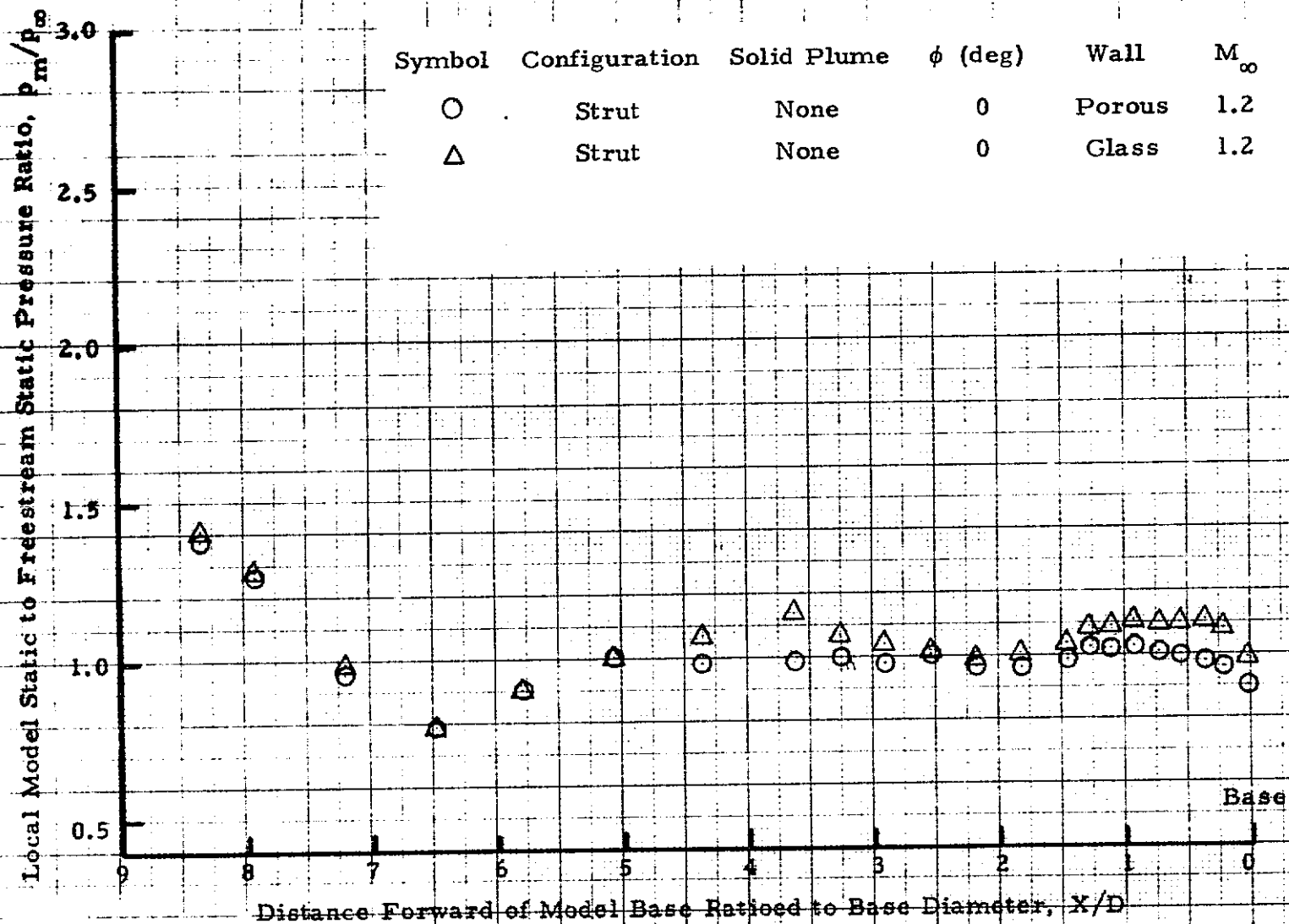


Fig. 27 - Model Surface Pressure Distribution, Wall Interference Effects, $M_\infty = 1.2$

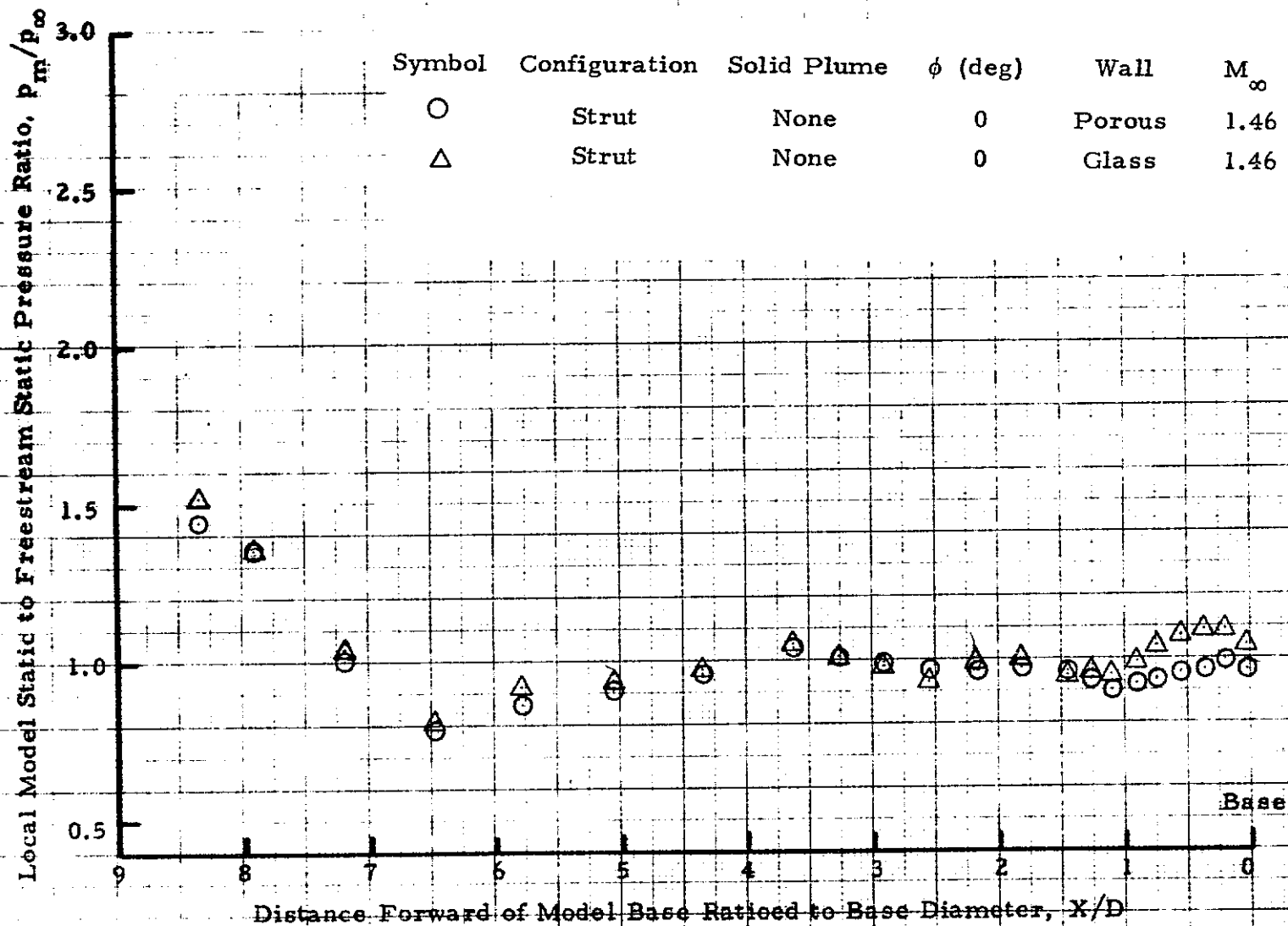


Fig. 28 - Model Surface Pressure Distribution, Wall Interference Effects, $M_\infty = 1.46$

Symbol	P_c (psia)	T_c (°F)
○	1825	101
□	115	81

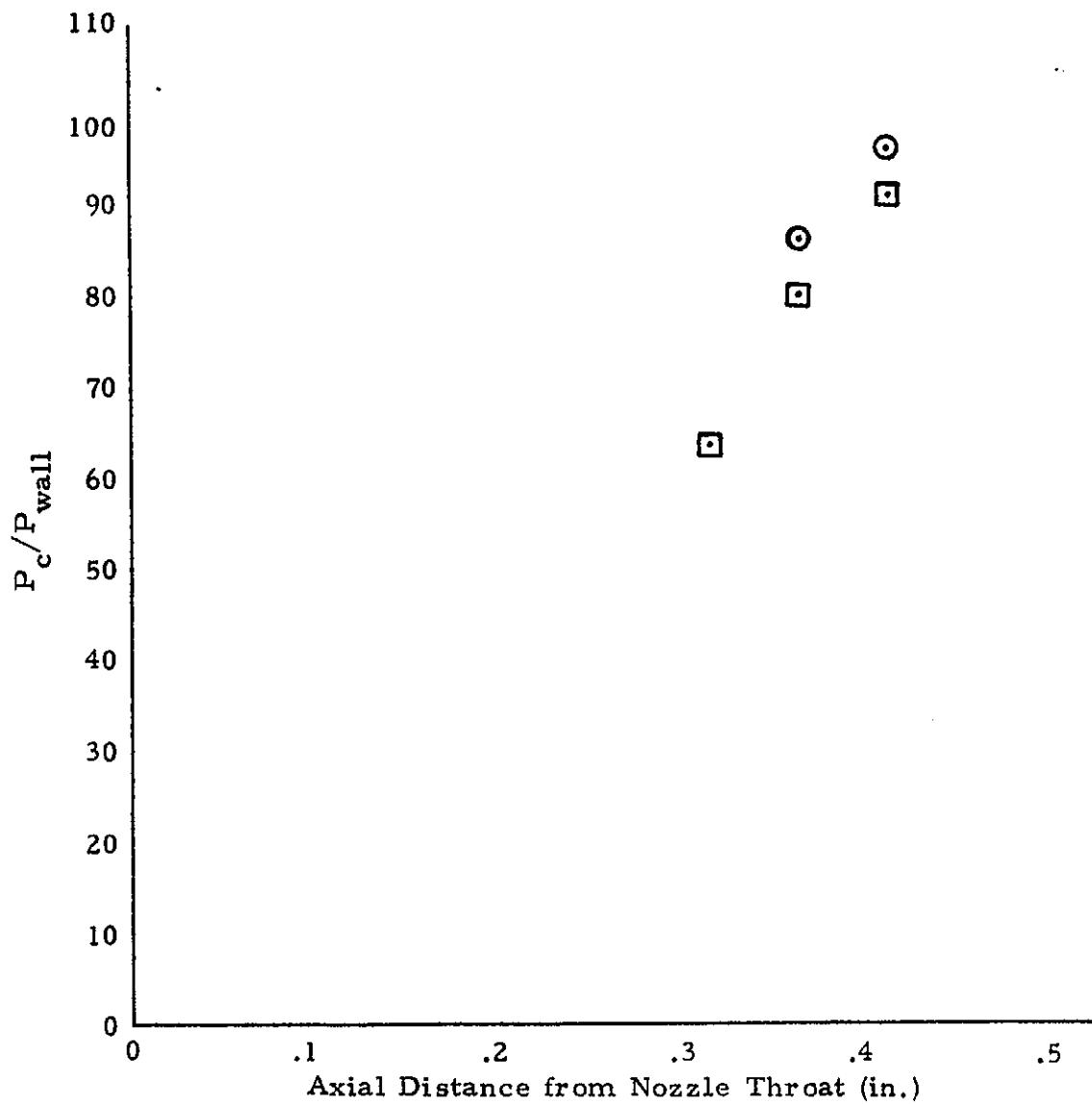


Fig. 29 - Nozzle Wall Pressure Distribution, $A/A^* = 6.5$, $\theta_{lip} = 35^\circ$, Air, Single Nozzle, Low Temperature

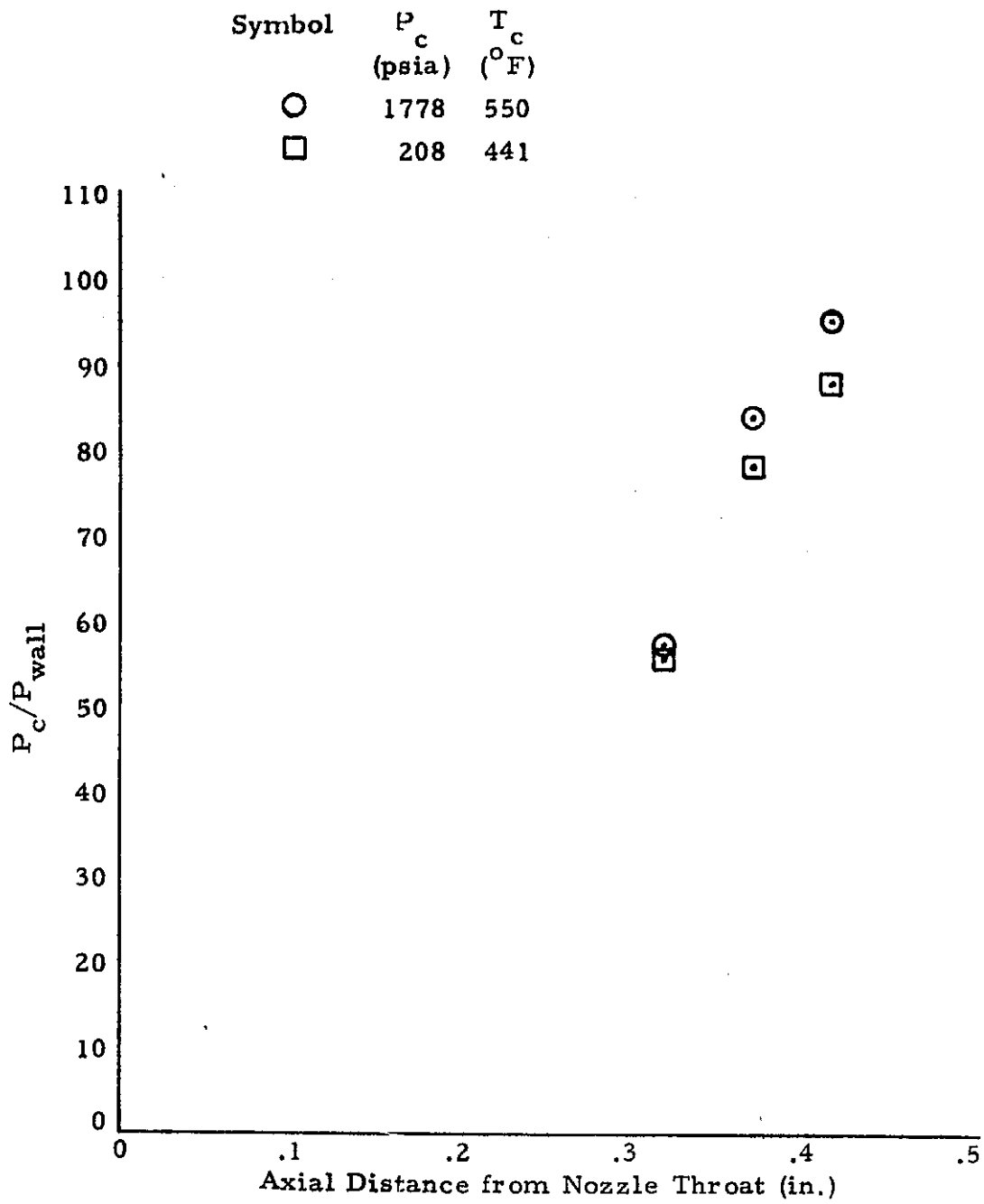


Fig. 30 - Nozzle Wall Pressure Distribution, $A/A^* = 6.5$, $\theta_{lip} = 35^\circ$,
Air, Single Nozzle, High Temperature

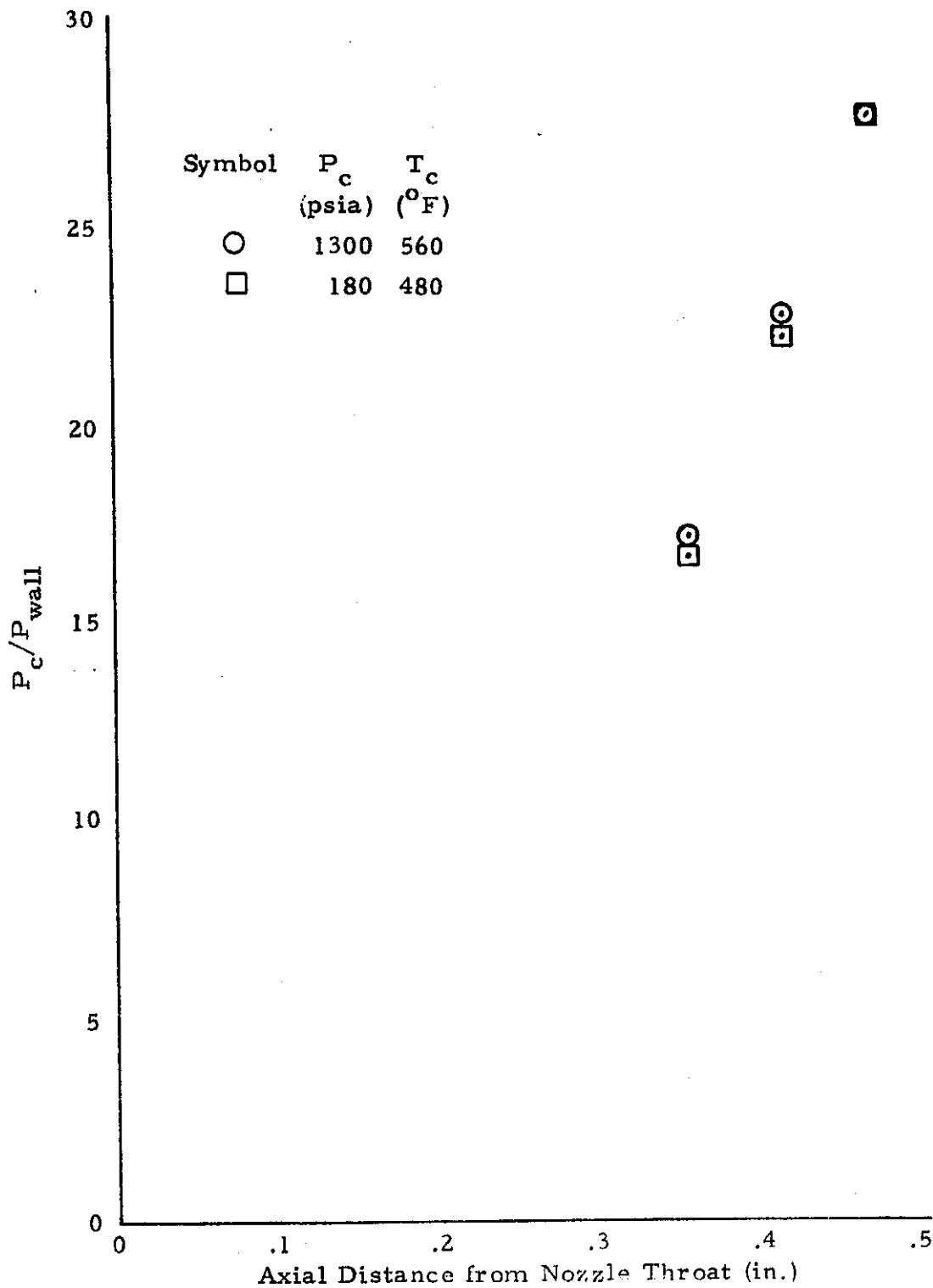


Fig. 31 - Nozzle Wall Pressure Distribution, $A/A^* = 3.5$, $\theta_{\text{lip}} = 25^{\circ}$, Air, Single Nozzle

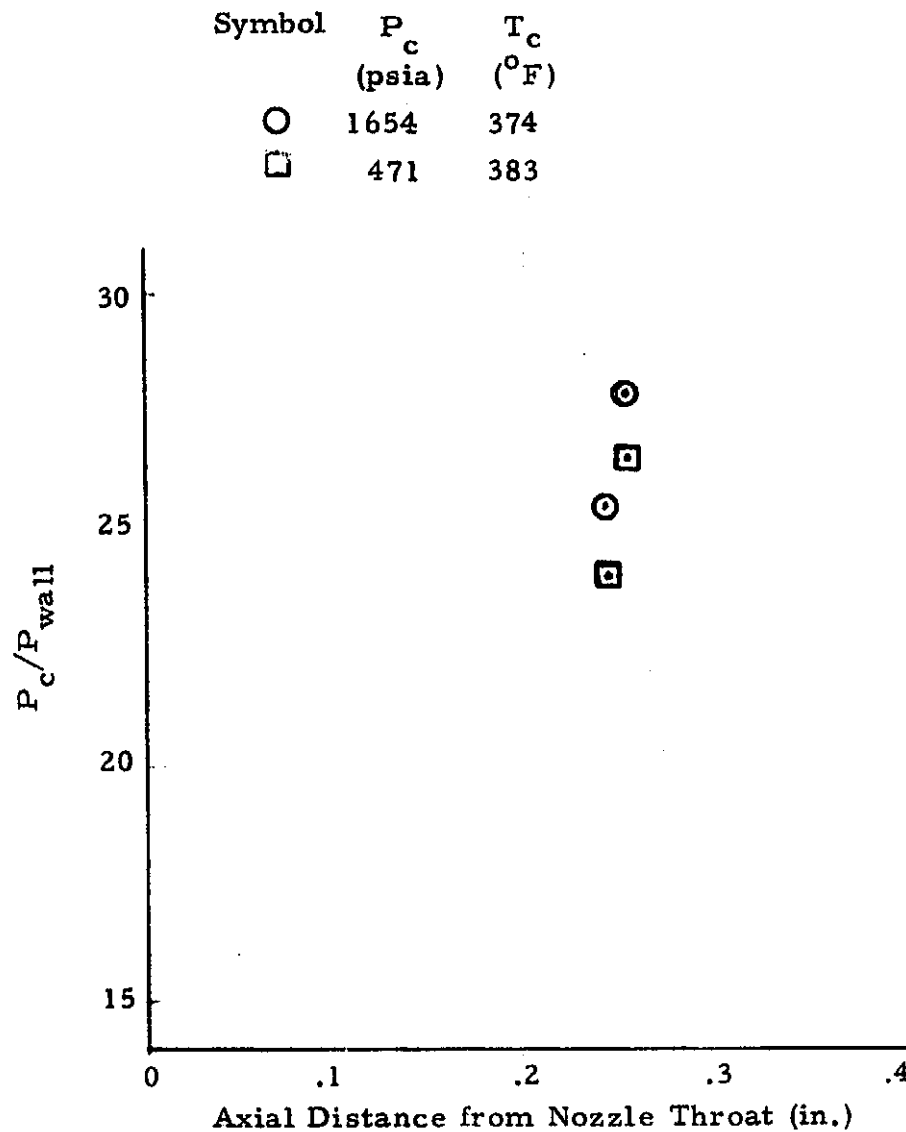


Fig. 32 - Nozzle Wall Pressure Distribution, $A/A^* = 4.0$, $\theta_{lip} = 25^\circ$, Air, Triple Nozzle

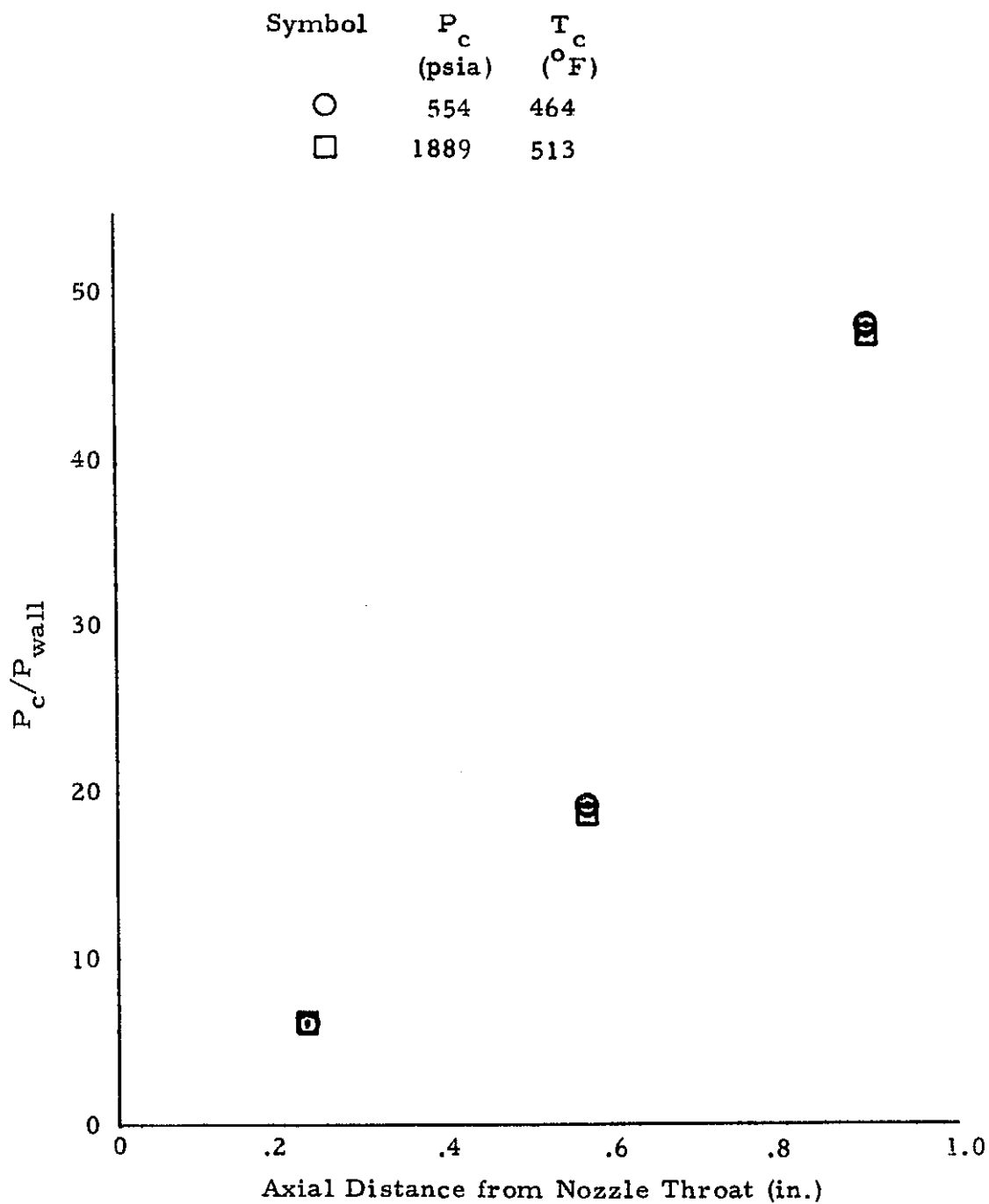


Fig. 33 - Nozzle Wall Pressure Distribution, $A/A^* = 8.0$, $\theta_{lip} = 15^\circ$, CF_4 , Single Nozzle

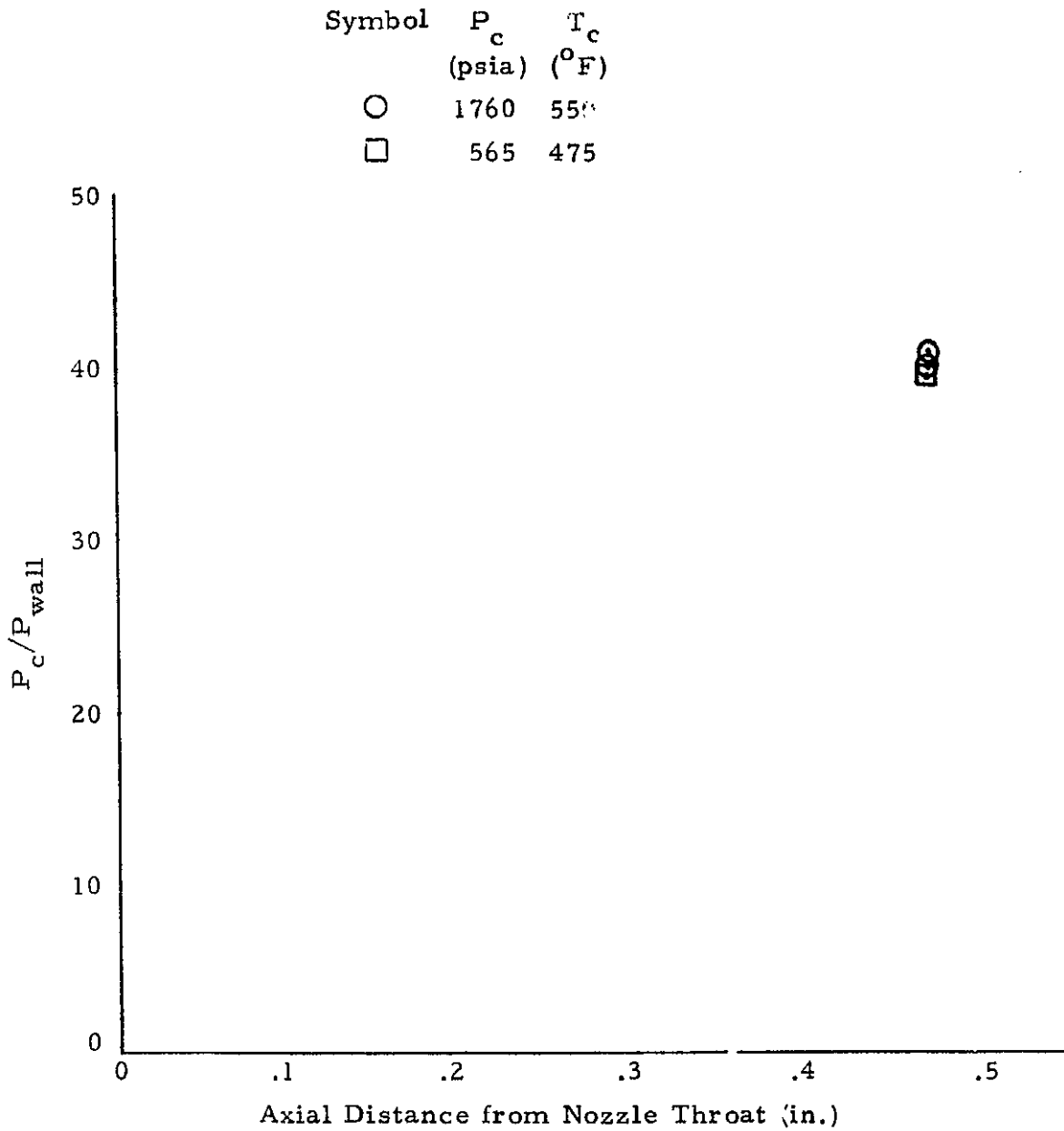


Fig. 34 - Nozzle Wall Pressure Distribution, $A/A^* = 8.0$, $\theta_{lip} = 15^\circ$, CF_4 , Triple Nozzle

- Method-of-Characteristics
Inviscid Plume Boundary Coordinates
- Method-of-Characteristics
Inviscid Internal Shock Coordinates

Nozzle \mathcal{C}_L

Air Single Nozzle

$A/A^* = 6.5$, $M_\infty = 0.0$, $\theta_{lip} = 35 \text{ deg}$

$P_c = 952 \text{ psia}$, $P_\infty = .48 \text{ psia}$

$T_c = 505^\circ\text{F}$

Fig. 35 - Comparison Between Analytical and Experimental Plume Shapes With No Near-Field Condensation (Air, Single Nozzle)

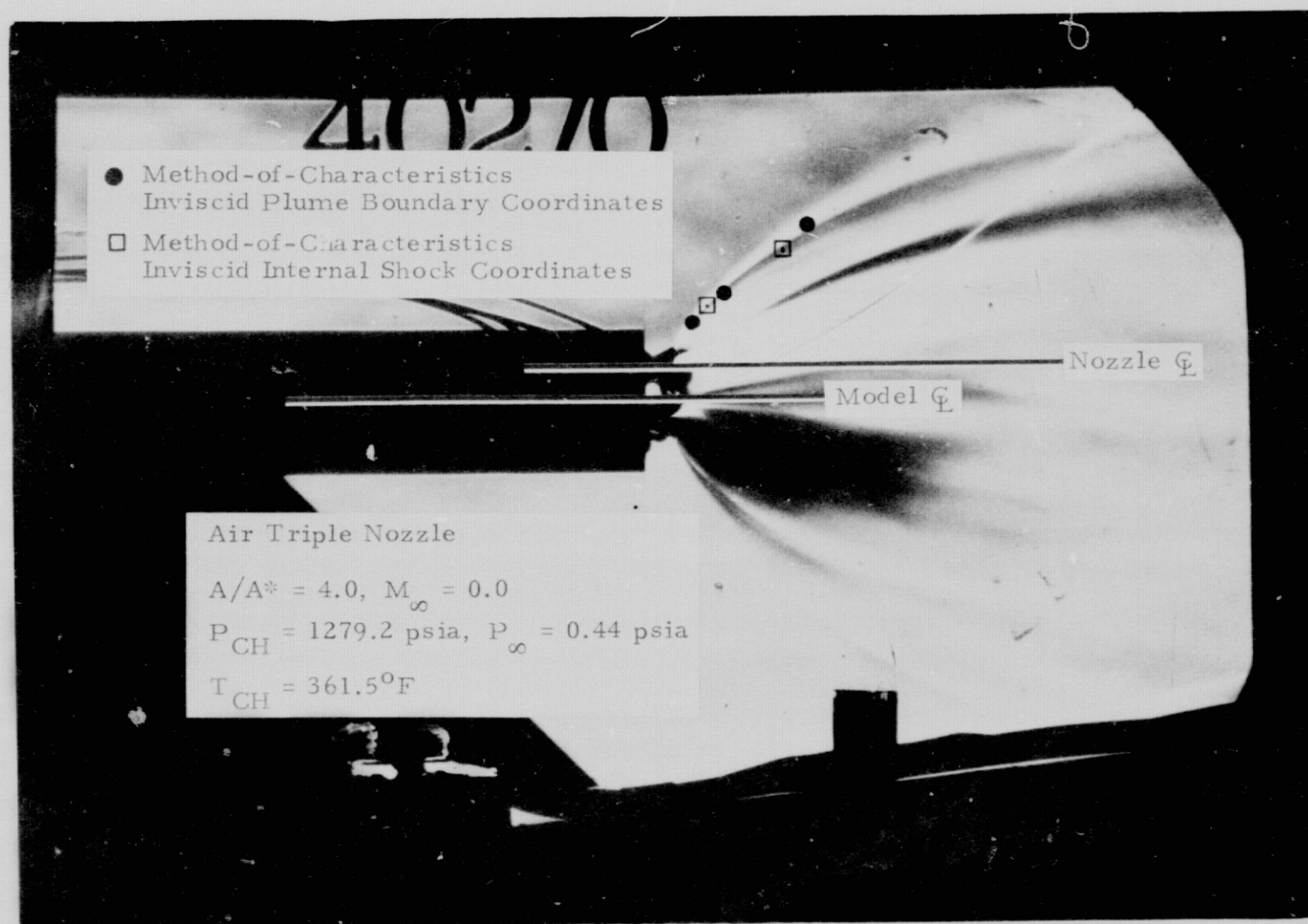


Fig. 36 - Comparison Between Analytical and Experimental Plume Shapes With No Near-Field Condensation (Air, Triple Nozzle)

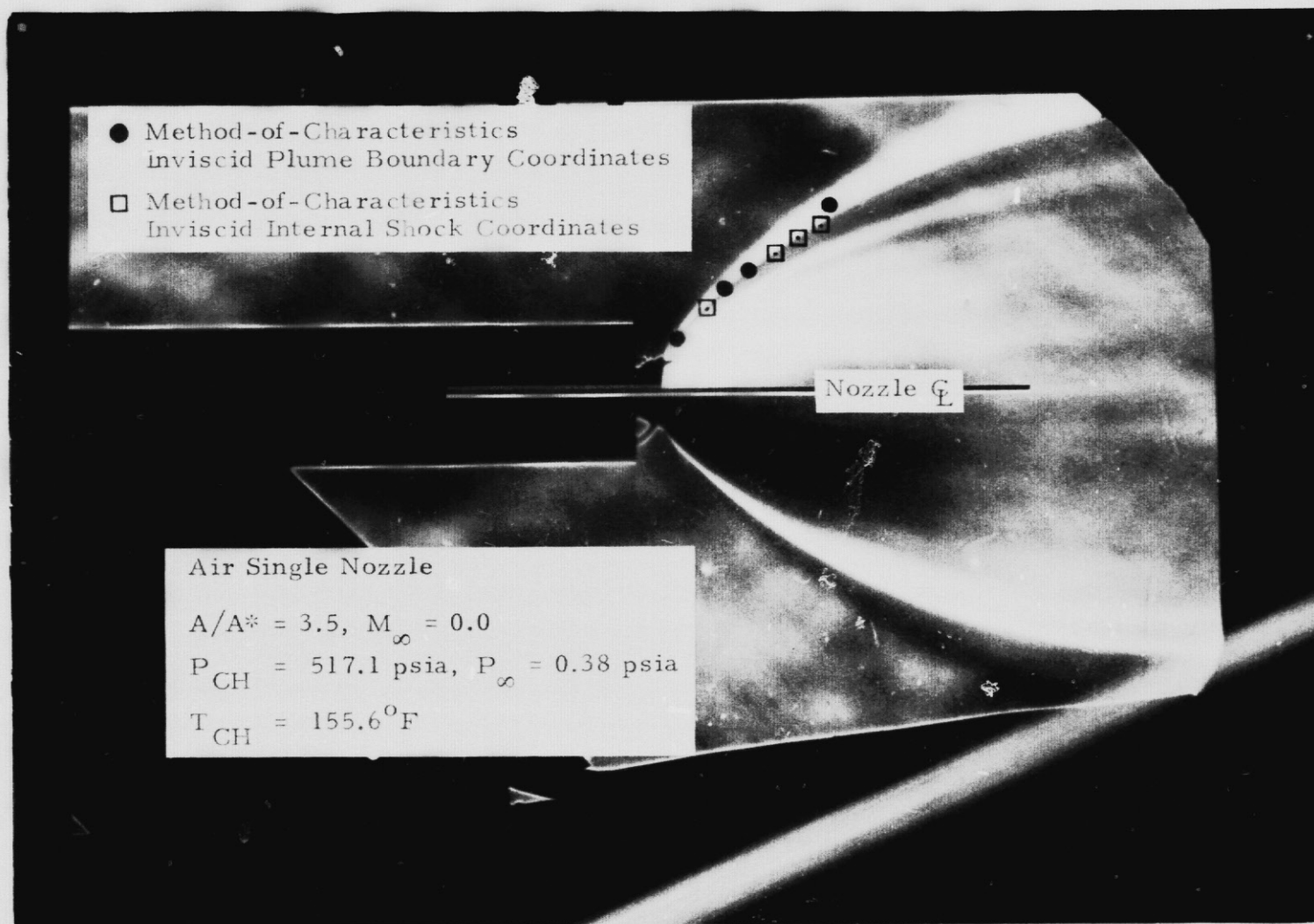


Fig. 37 - Comparison Between Analytical and Experimental Plume Shapes With No Observed Condensation

- Method-of-Characteristics
Inviscid Plume Boundary
Coordinates
- Method-of-Characteristics
Inviscid Internal Shock
Coordinates

Nozzle C_L

Air Single Nozzle

$A/A^* = 3.5$, $M_\infty = 0.0$

$P_{CH} = 1850$ psia, $P_\infty = .49$ psia

$T_{CH} = 49^\circ\text{F}$

Fig. 38 - Comparison Between Analytical and Experimental Plume Shapes With Observed Condensation

Nozzle Config. Single, $A/A^* = \underline{6.5}$, $\theta_{lip} = \underline{35}$ deg
 $M_\infty = \underline{0.9}$, $P_\infty = \underline{10.7}$ psi, Test Gas Air, $T_{t_c} = \underline{200}$ °F

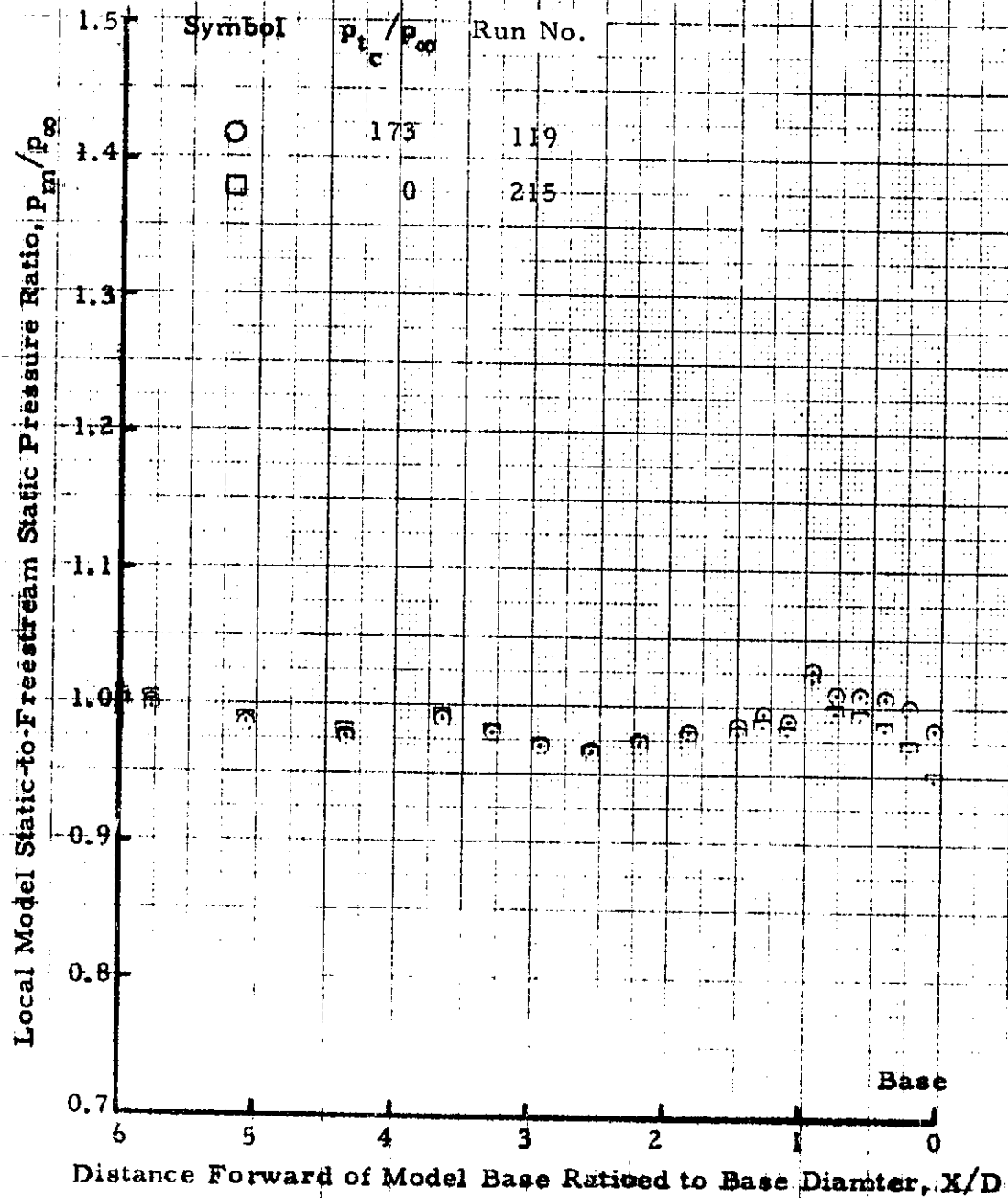


Fig. 39 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 0.9$, $p_\infty = 10.7$ psi, Test Gas Air, $T_{t_c} = 600$ °F

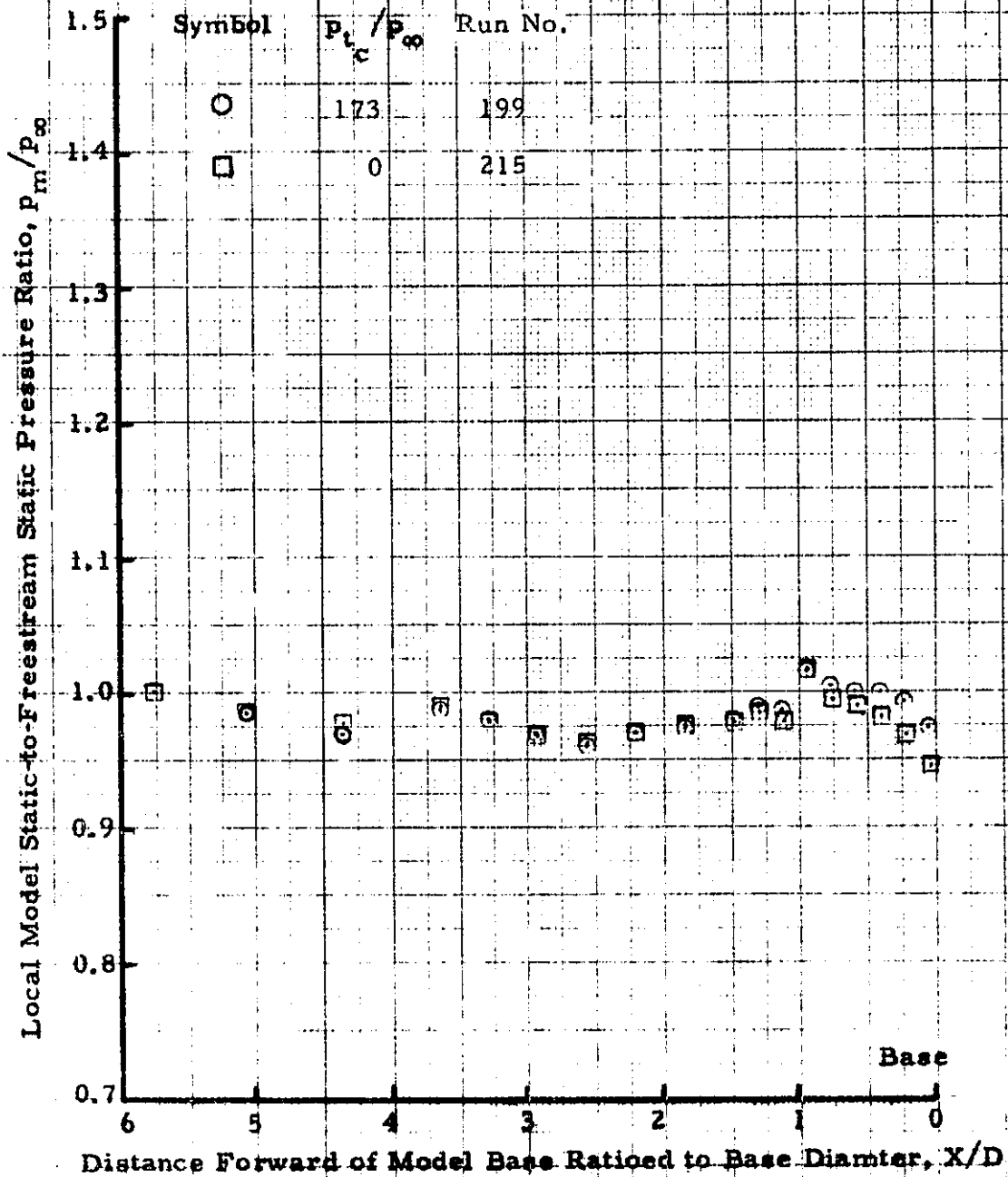


Fig. 40 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 3^\circ$ deg

$M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas Air, $T_{t_c} = 200$ °F

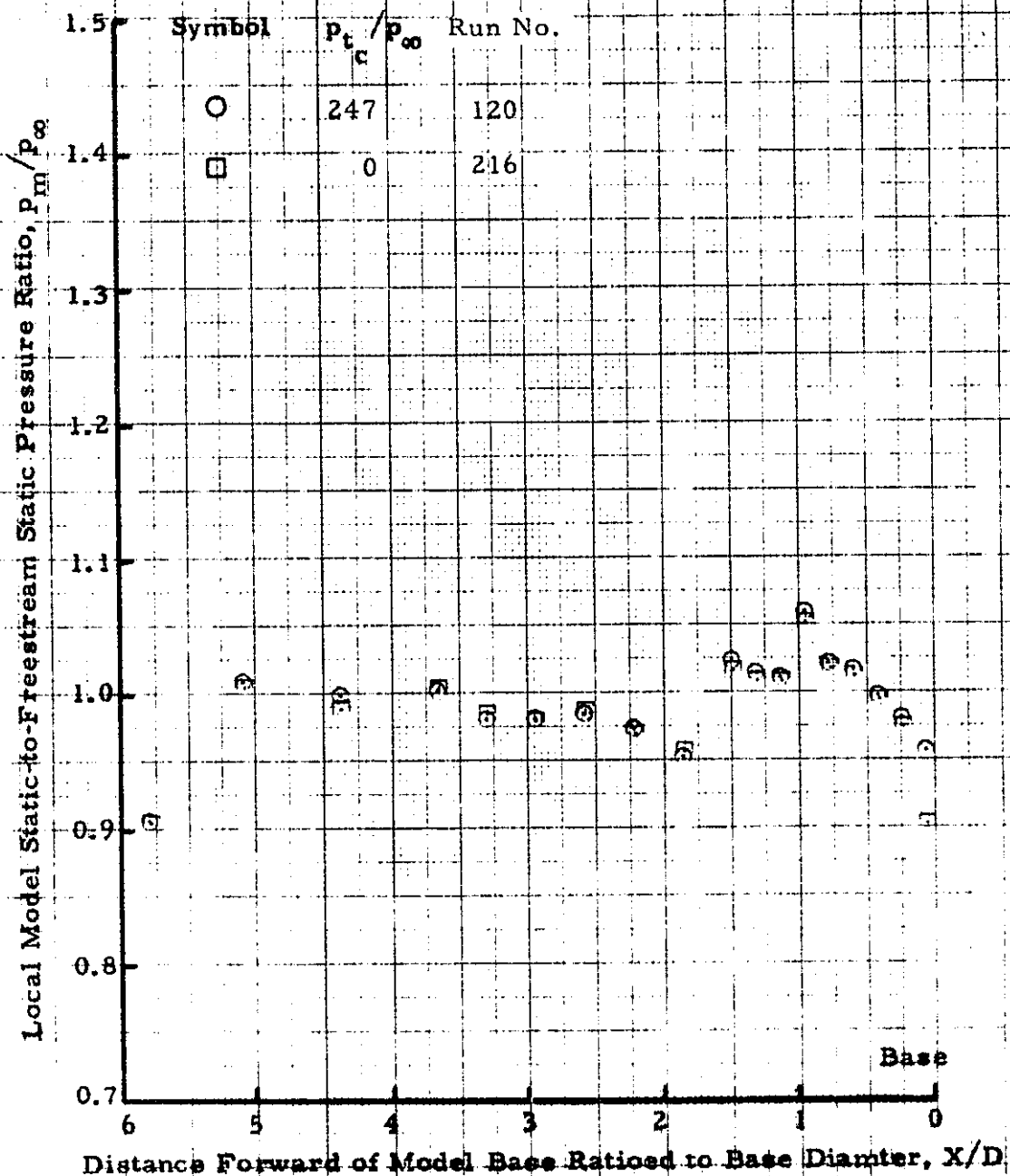


Fig. 41 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas Air, $T_{t_c} = 600$ °F

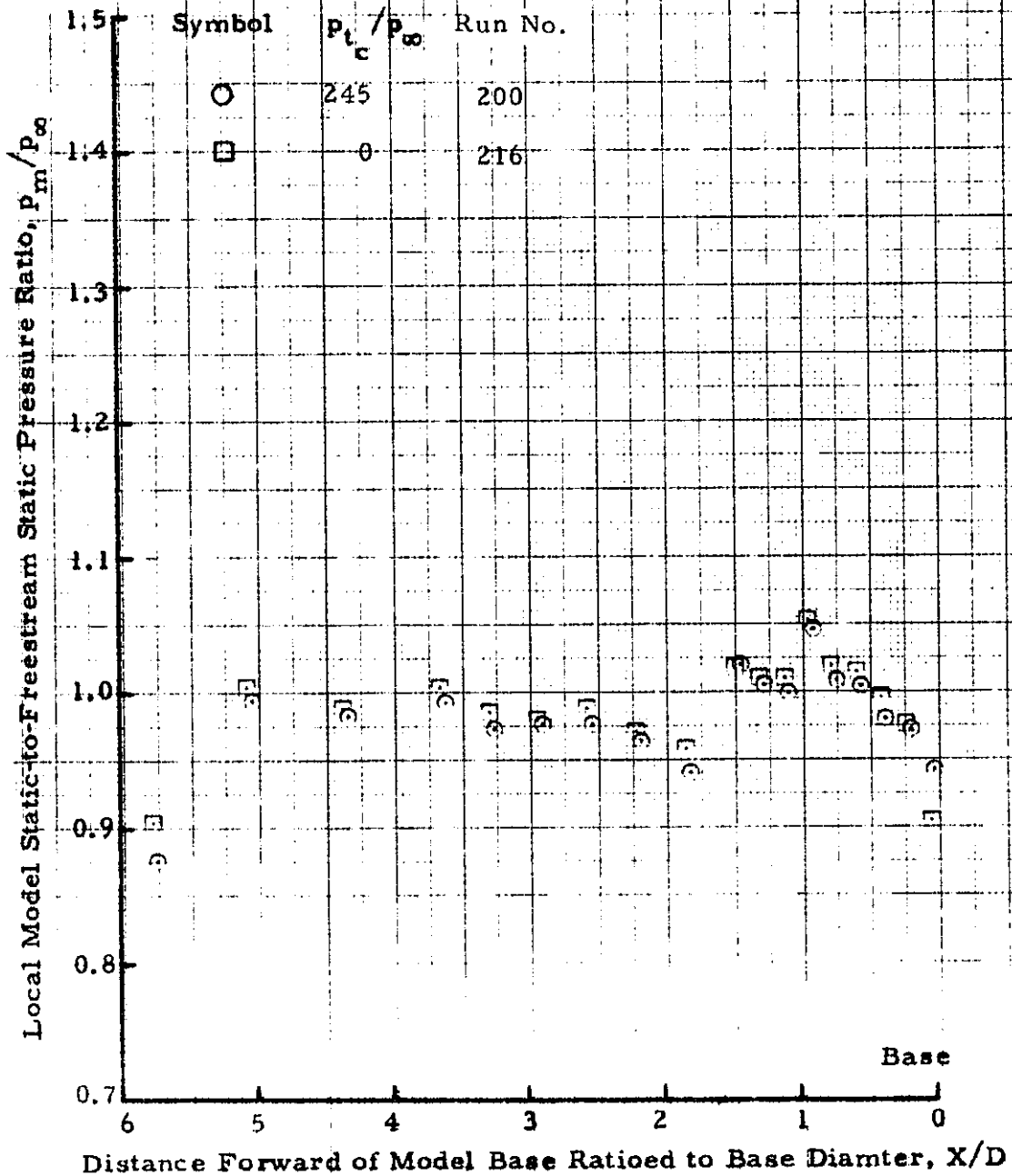


Fig. 42 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 1.46$, $p_\infty = 5.1$ psi, Test Gas Air, $T_{t_c} = 200$ °F

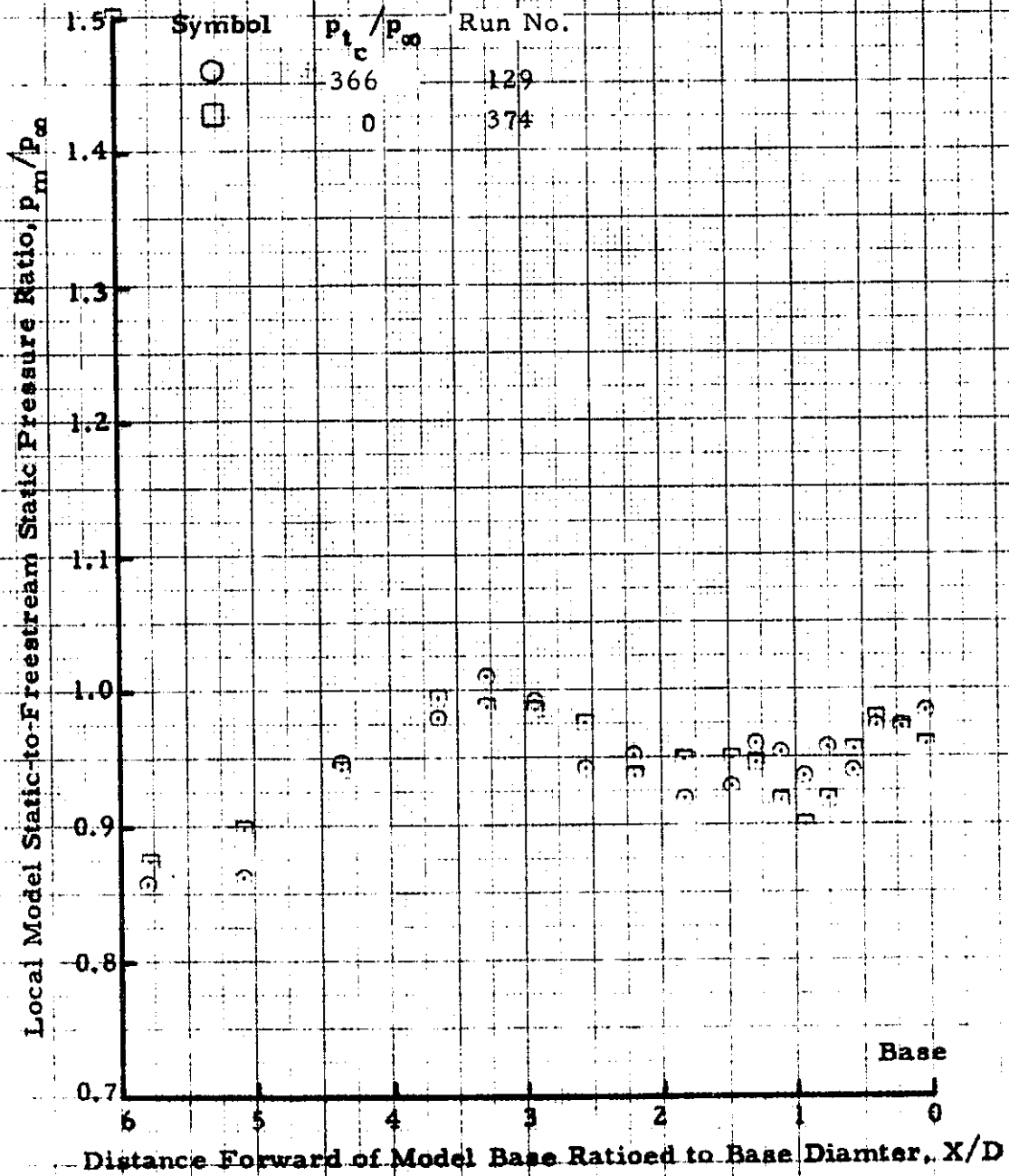


Fig. 43 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 1.46$, $p_\infty = 5.1$ psi, Test Gas Air, $T_{t_c} = 600$ °F

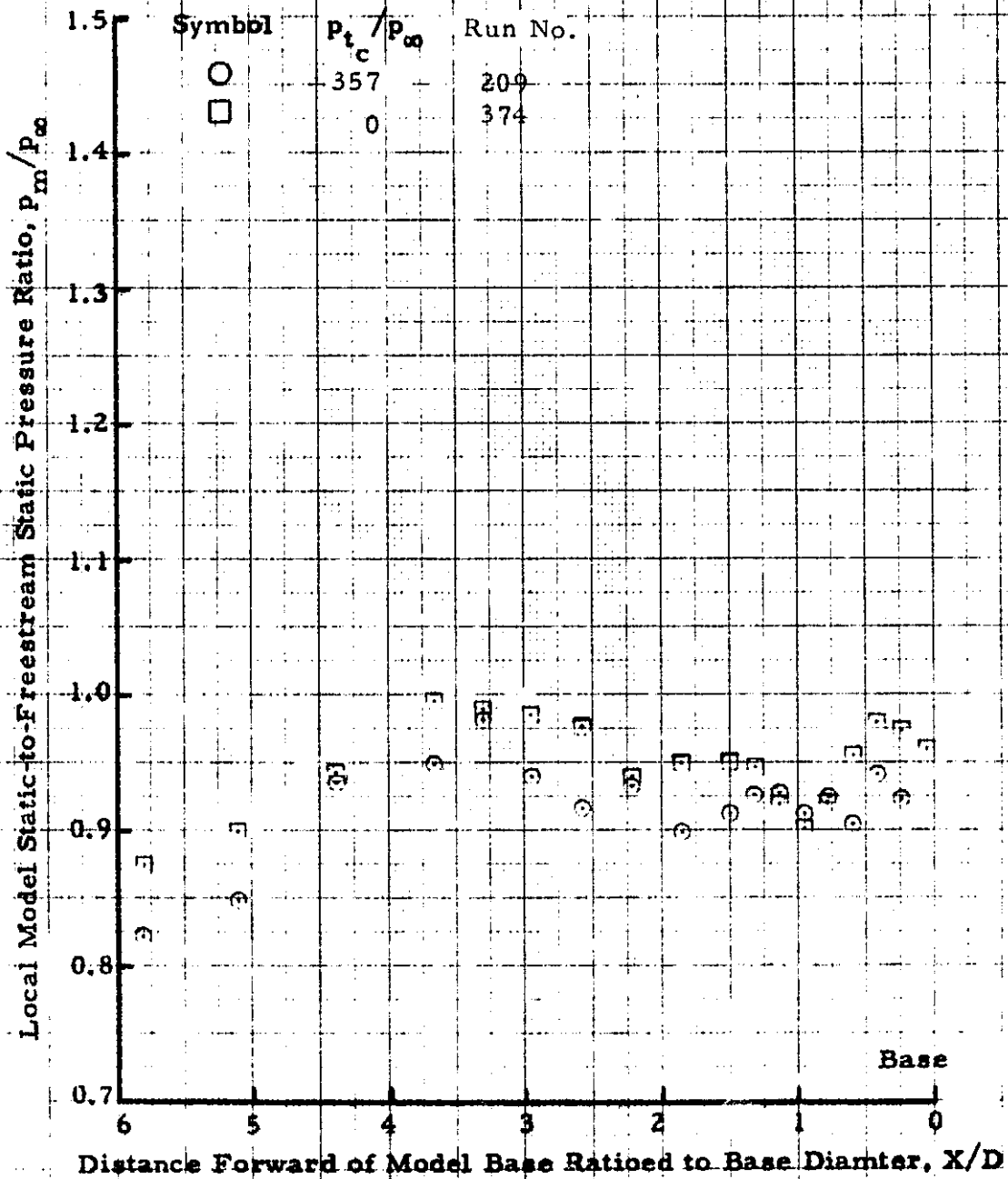


Fig. 44 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas Air, $T_{t_c} = 200$ °F

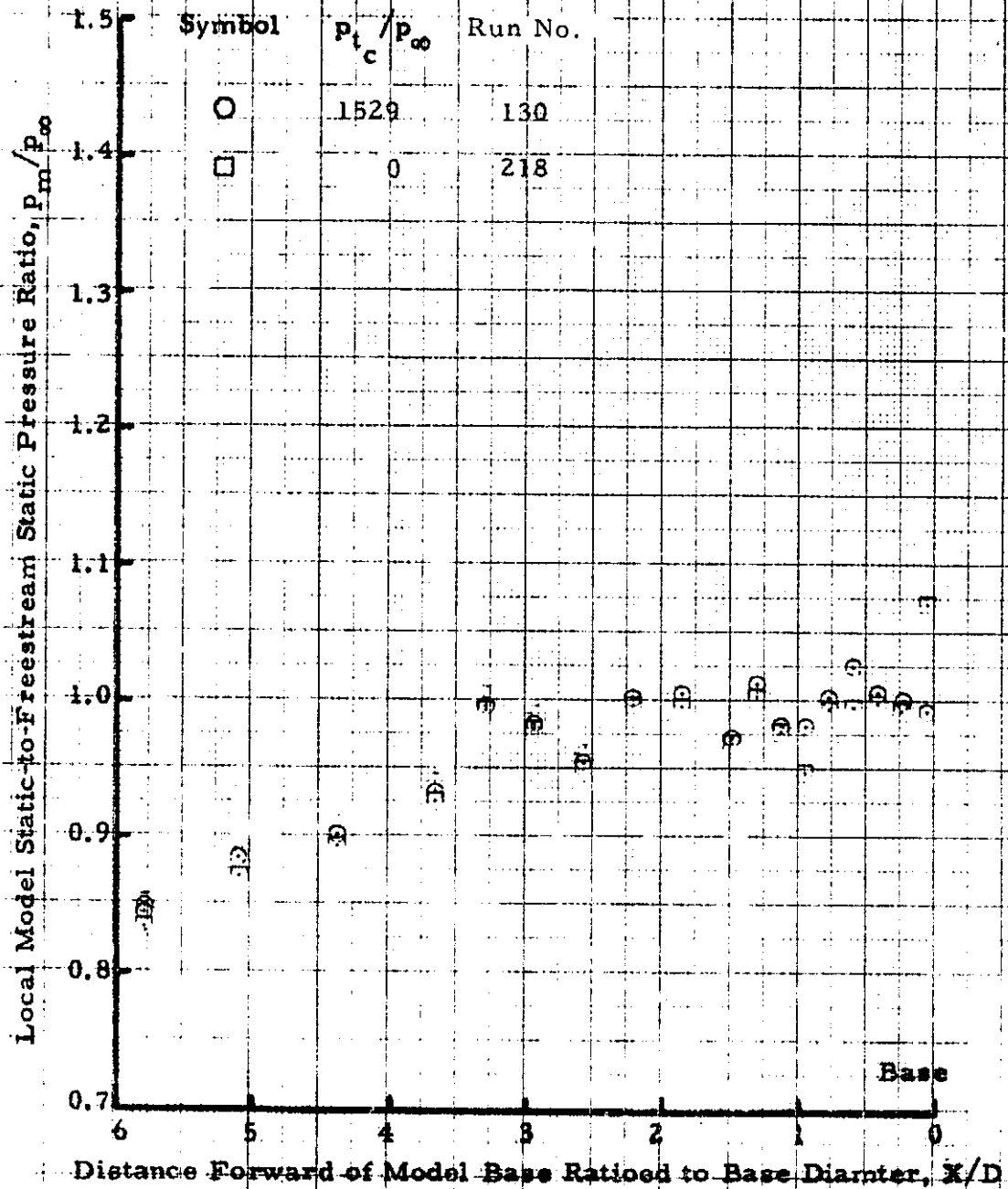


Fig. 45 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas Air, $T_{t_c} = 600$ °F

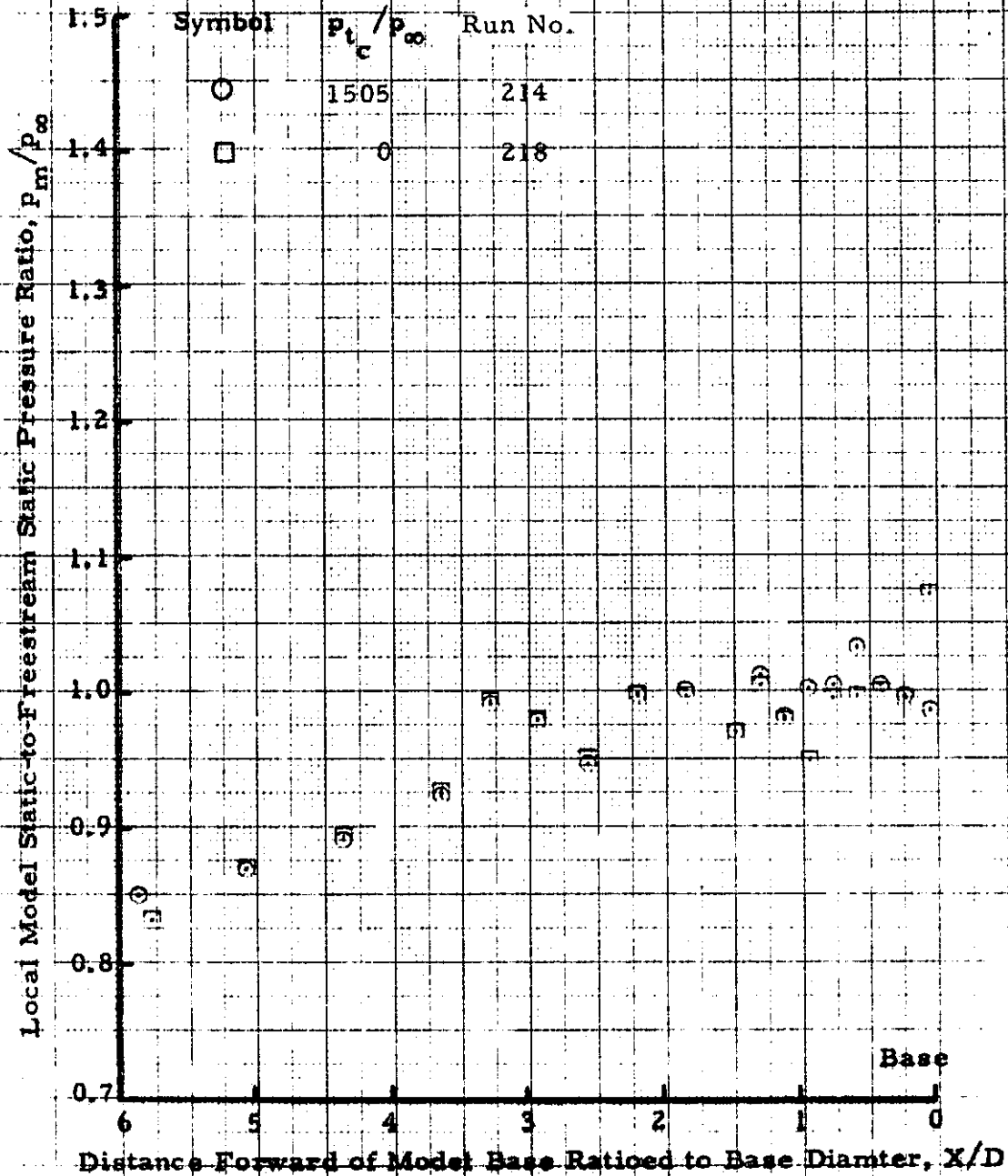


Fig. 46 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg
 $M_\infty = 0.9$, $p_\infty = 10.7$ psi, Test Gas Air, $T_{t_c} = 200$ °F

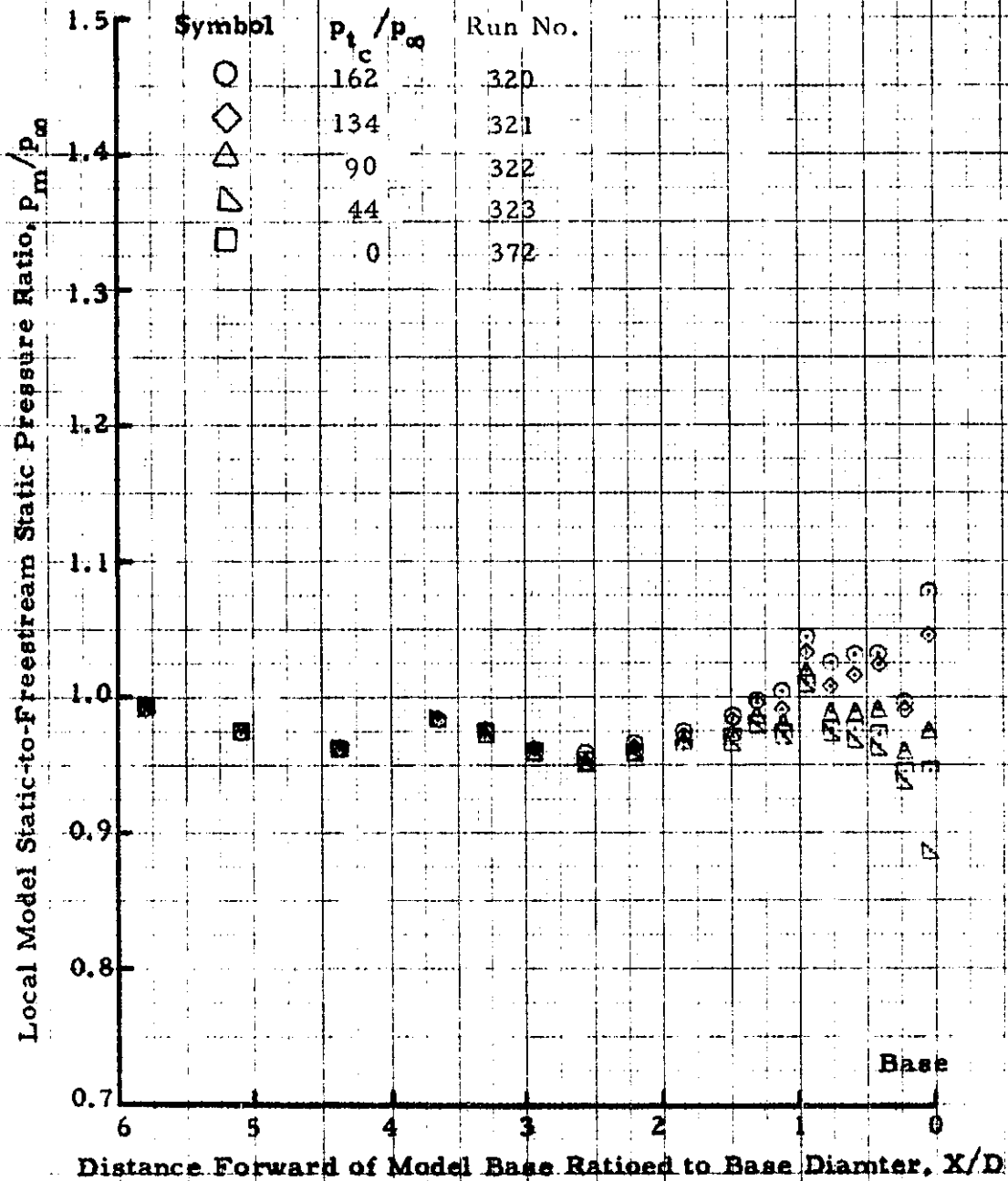


Fig. 47 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = \underline{3.5}$, $\theta_{lip} = \underline{25}$ deg
 $M_\infty = \underline{0.9}$, $p_\infty = \underline{10.7}$ psi, Test Gas Air, $T_{t_c} = \underline{500}$ °F

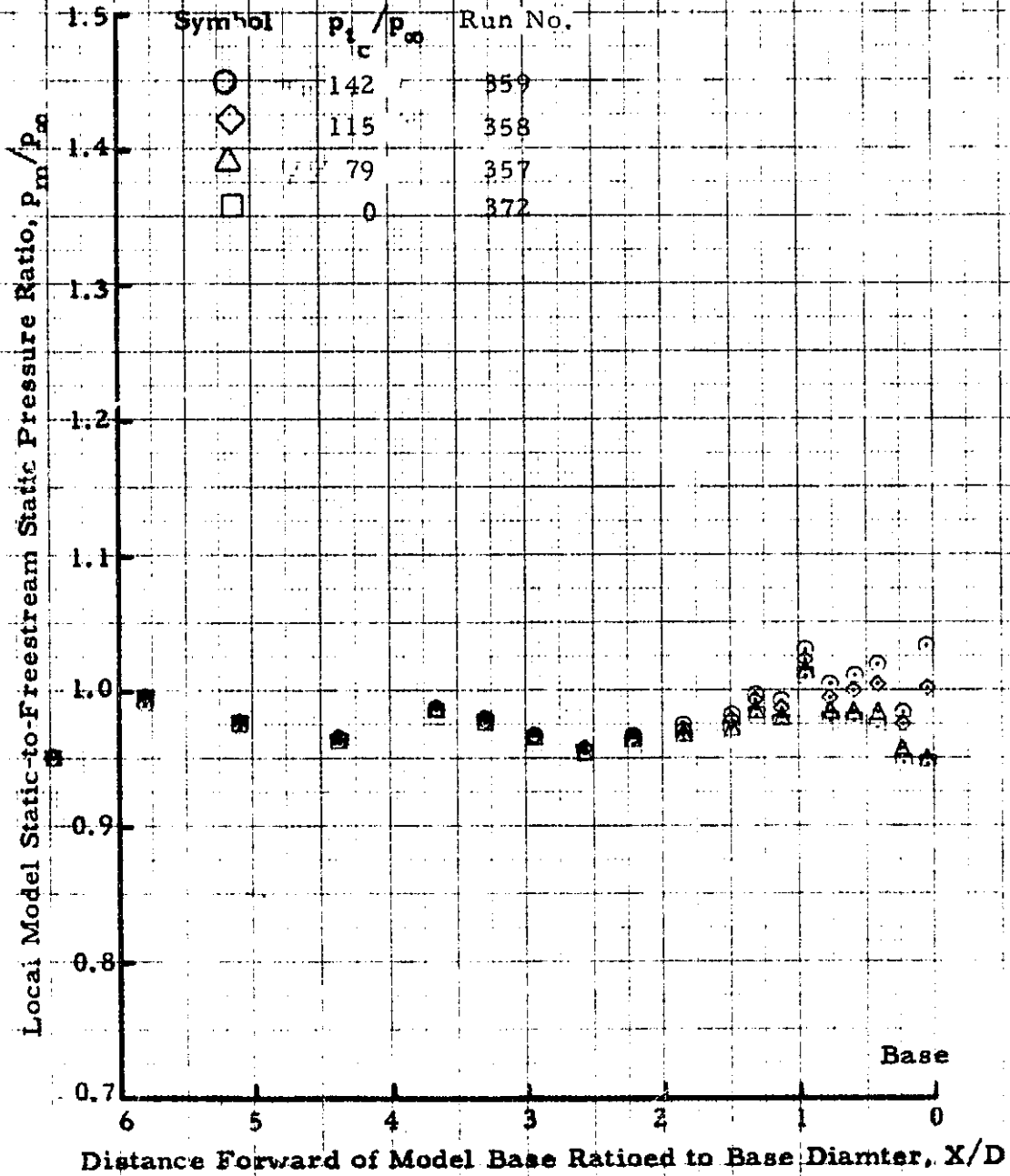


Fig. 48 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg
 $M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas Air, $T_{t_c} = 200$ °F

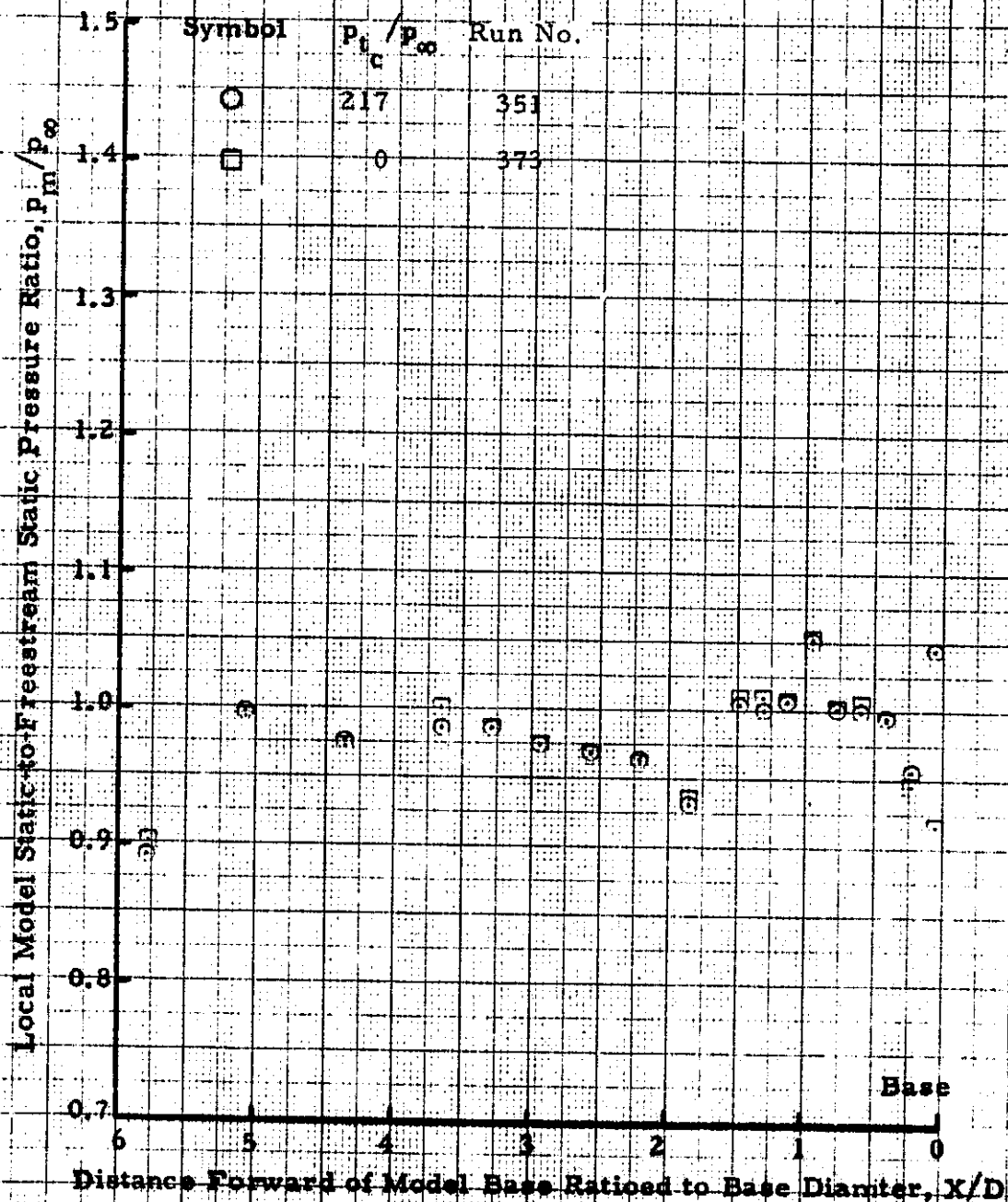


Fig. 49 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg
 $M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas Air, $T_{t_c} = 500$ °F

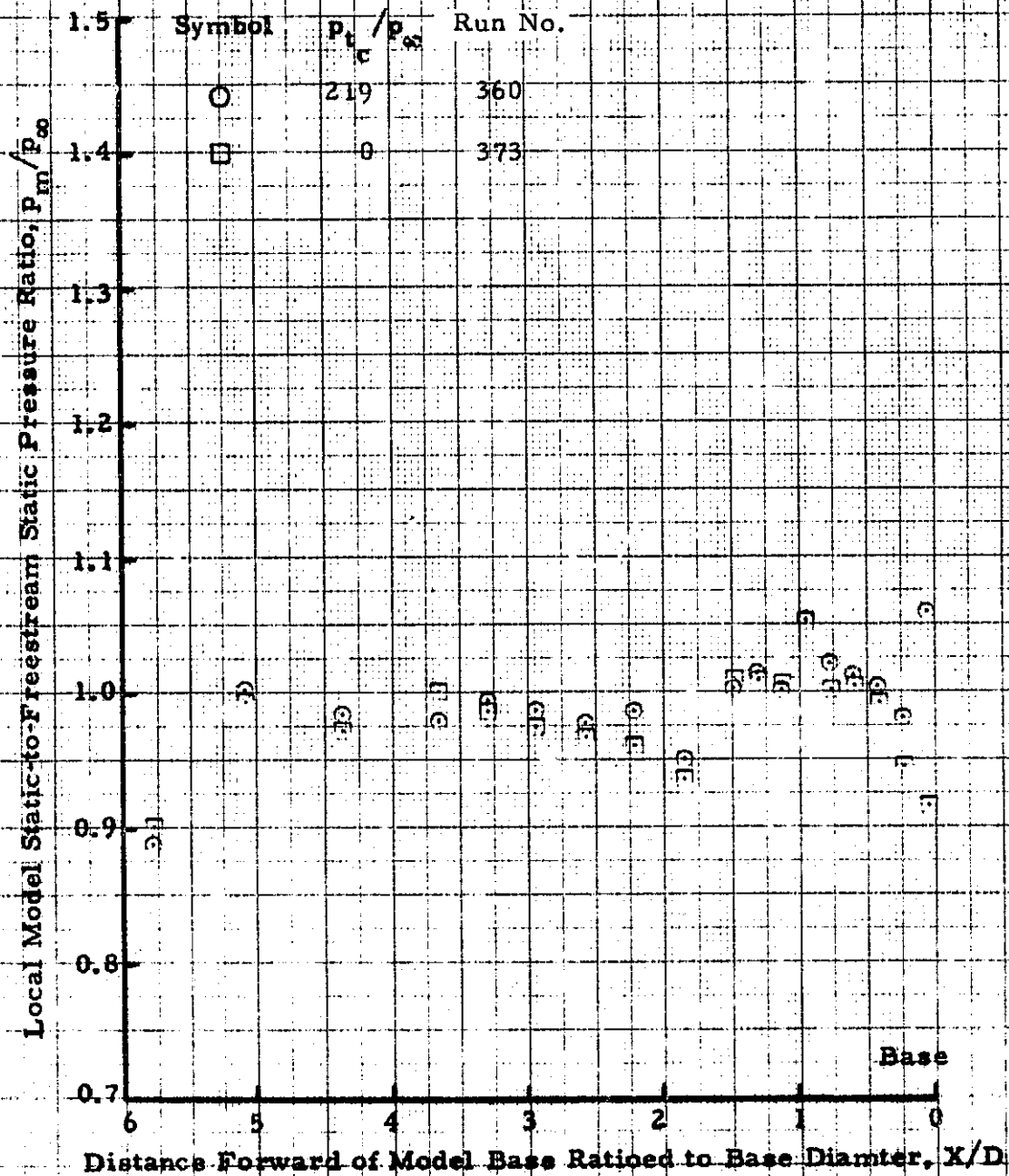


Fig. 50 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg
 $M_\infty = 1.46$, $p_\infty = 5.1$ psi, Test Gas Air, $T_{t_c} = 200$ °F

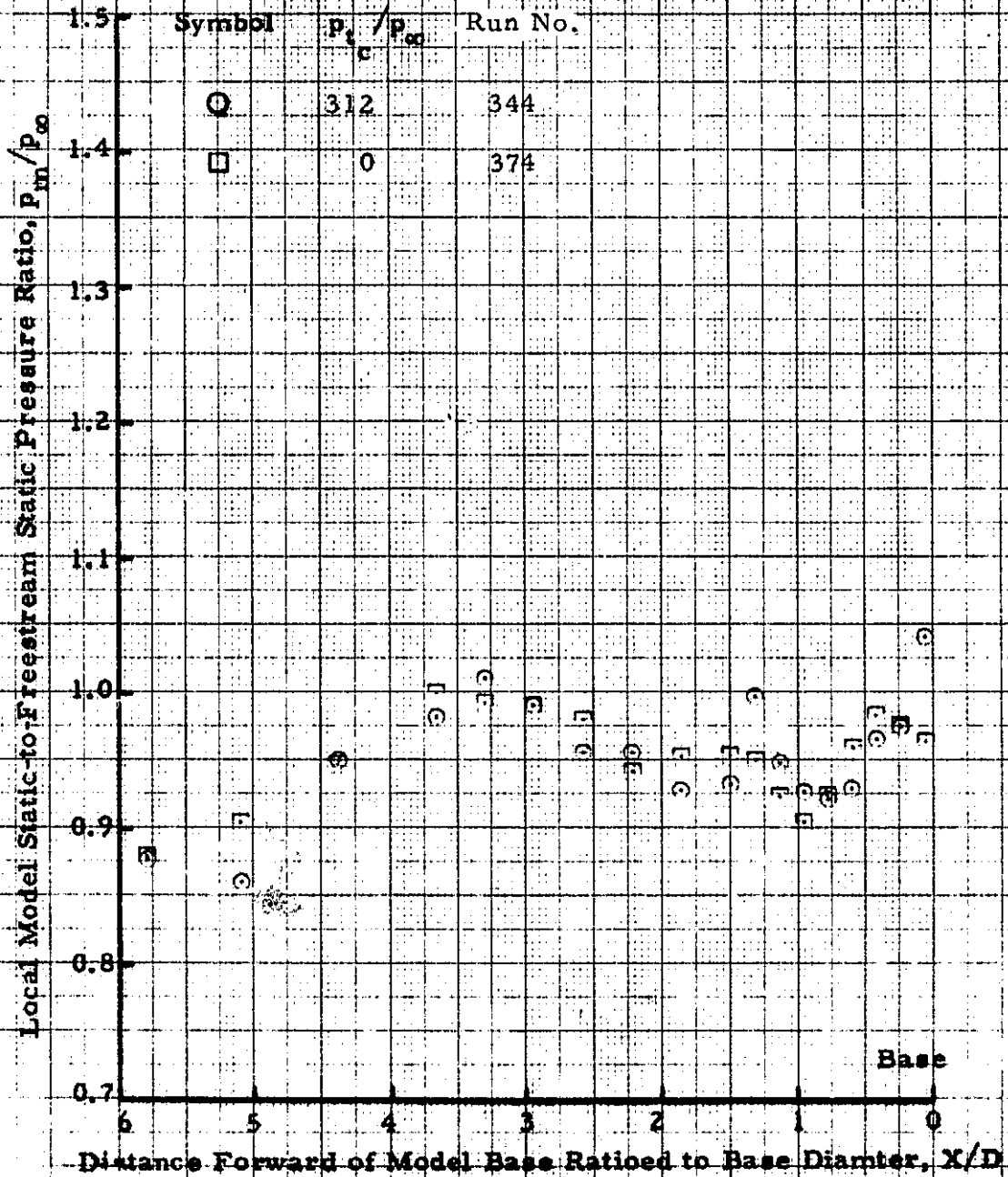


Fig. 51 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* =$ 3.5, $\theta_{lip} =$ 25 deg
 $M_\infty =$ 1.46, $p_\infty =$ 5.1 psi, Test Gas Air, $T_{t_c} =$ 500 °F

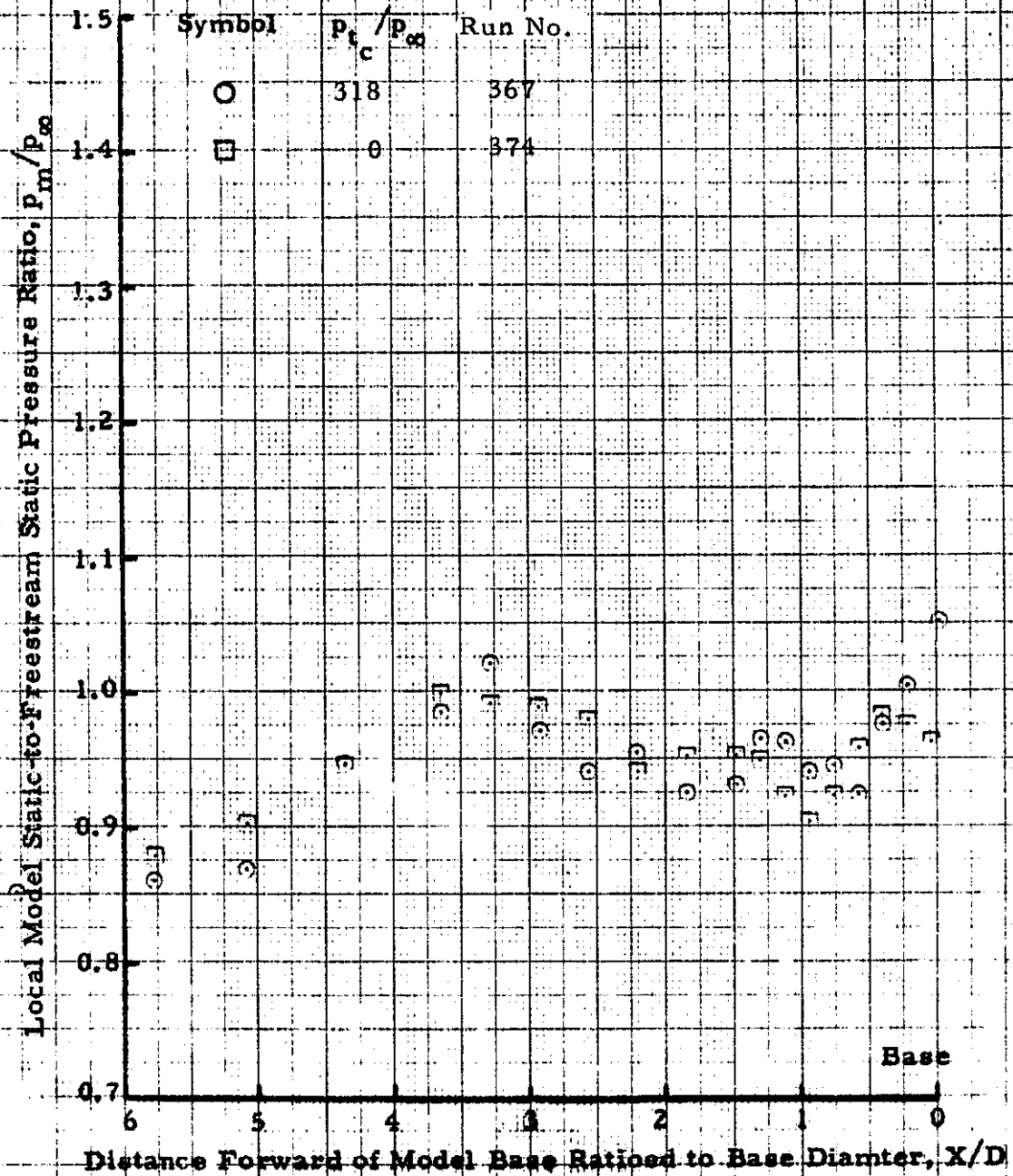


Fig. 52 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas Air, $T_{t_c} = 200$ °F

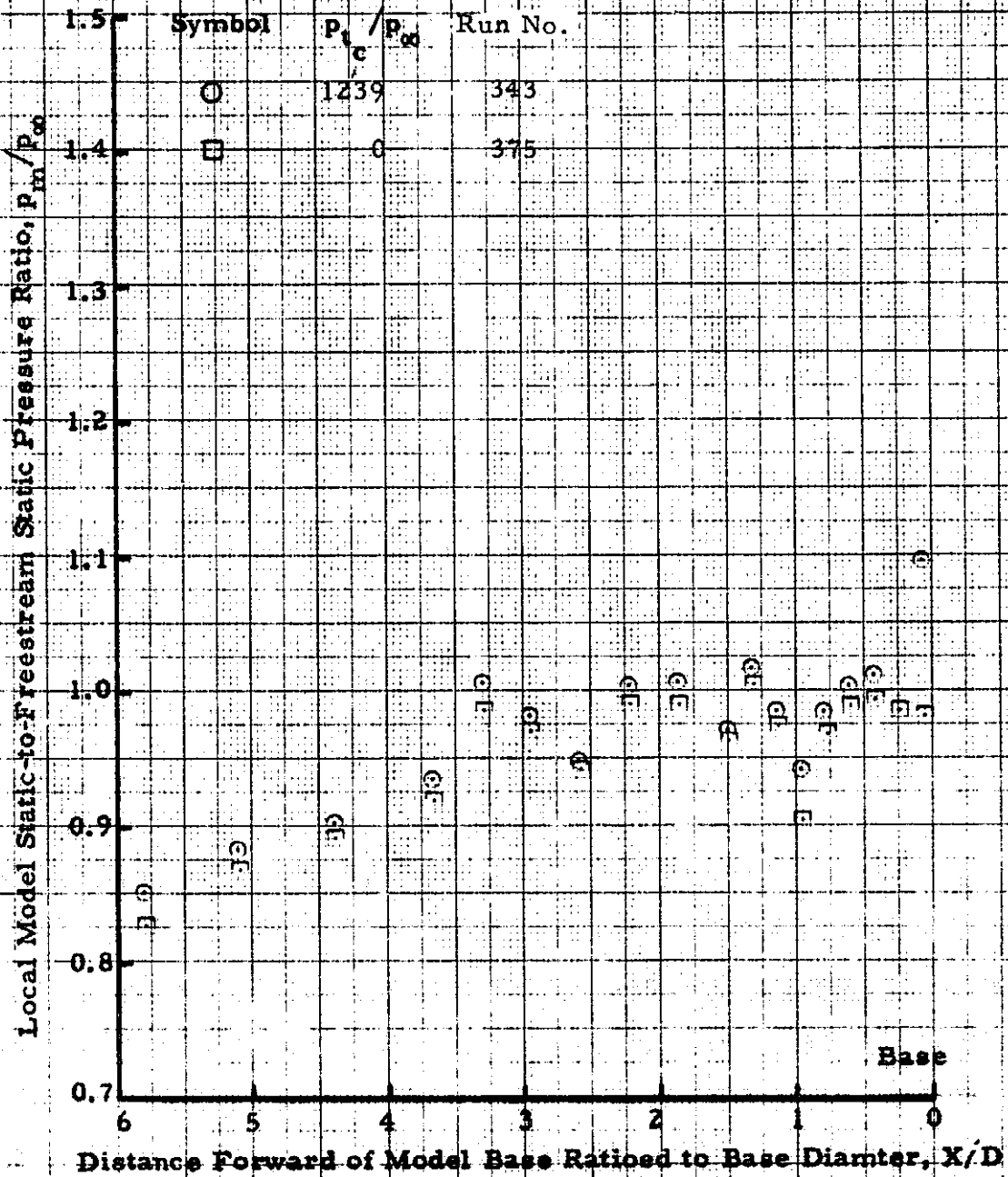


Fig. 53 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas Air, $T_{t_c} = 500$ °F

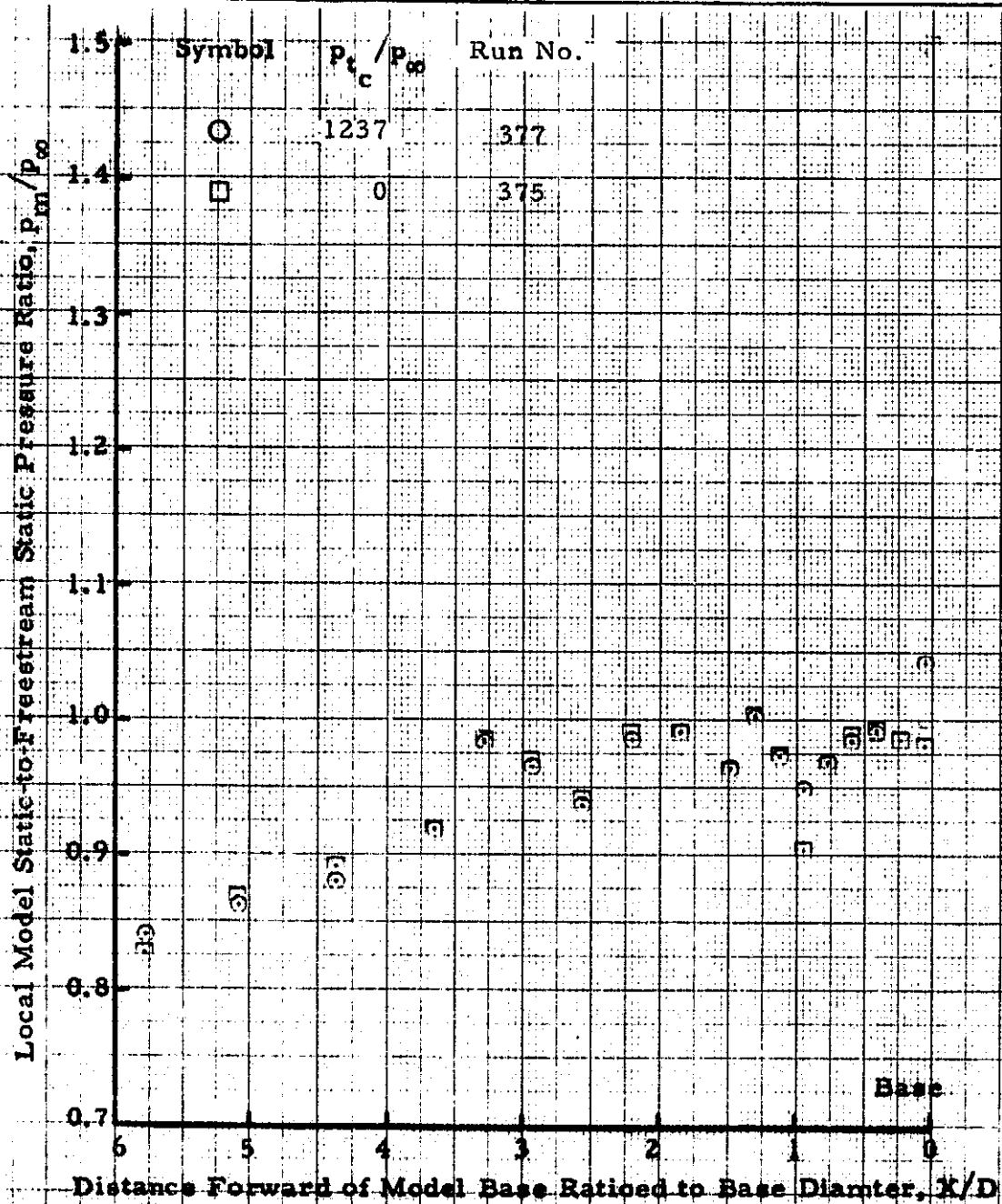


Fig. 54 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 4.0$, $\theta_{lip} = 25$ deg
 $M_\infty = 0.9$, $p_\infty = 10.7$ psi, Test Gas Air, $T_{t_c} = 200$ °F

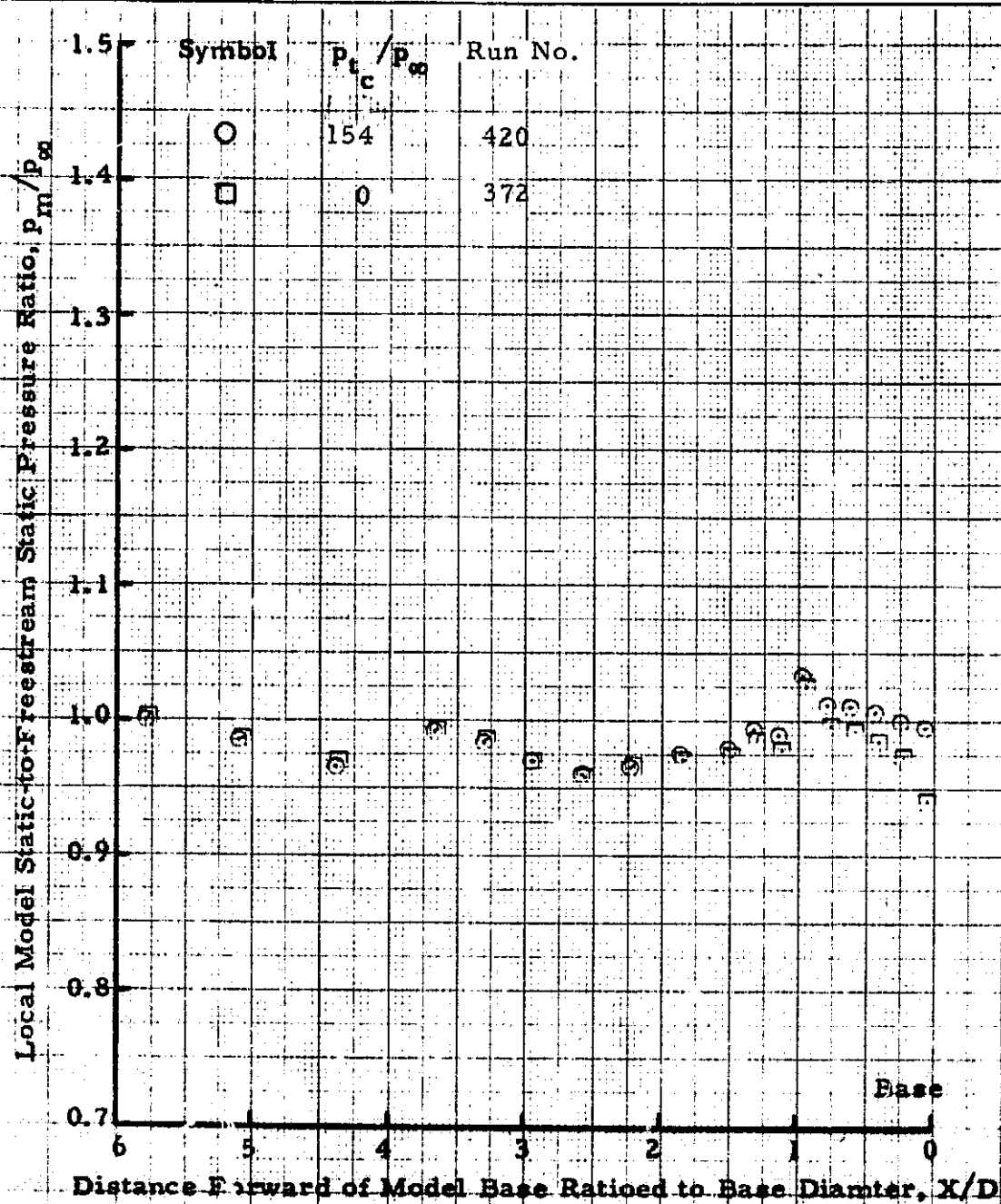


Fig. 55 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 4.0$, $\theta_{lip} = 25$ deg
 $M_\infty = 0.9$, $p_\infty = 10.7$ psi, Test Gas Air, $T_{t_c} = 500$ °F

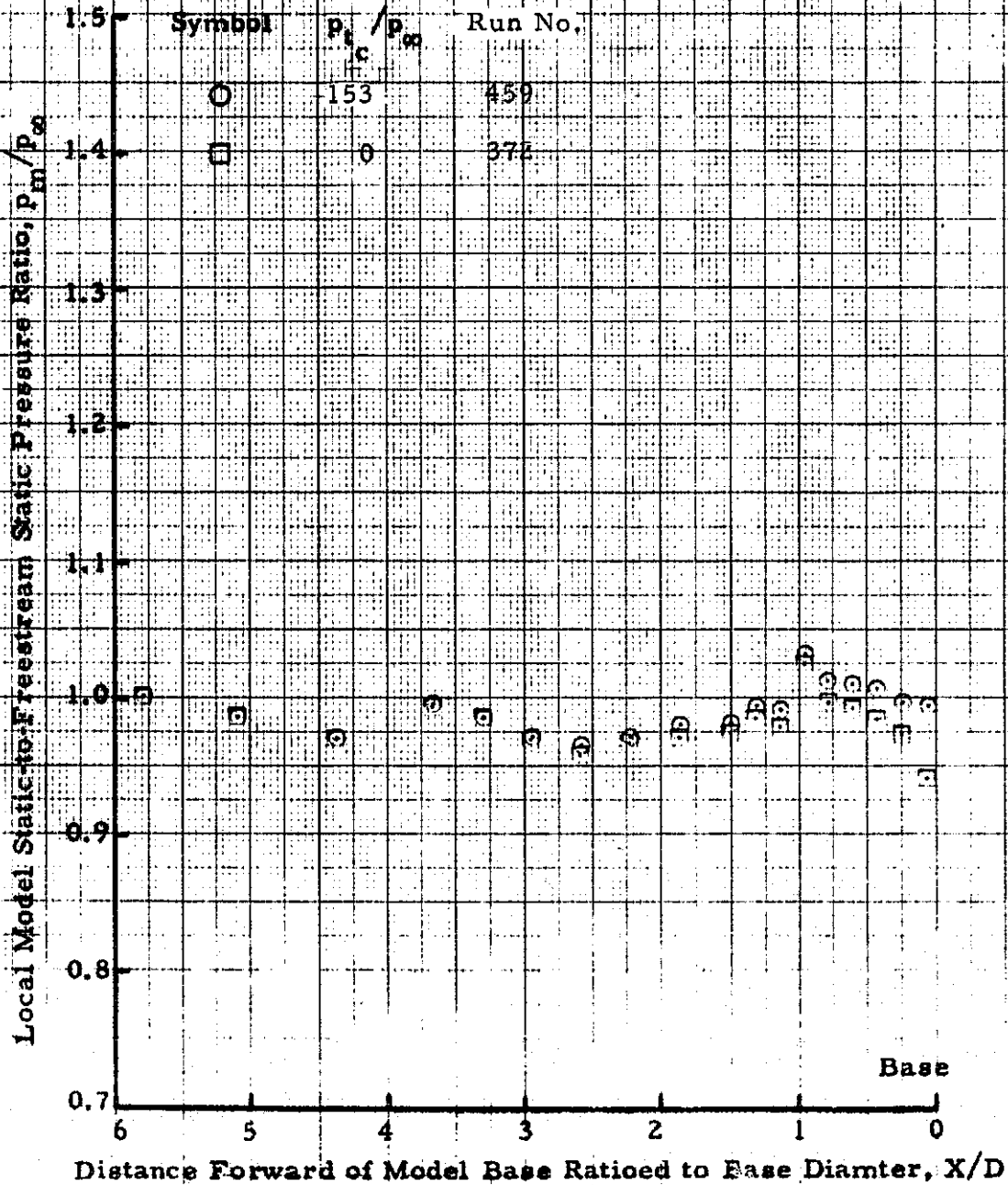


Fig. 56 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 4.0$, $\theta_{lip} = 25$ deg
 $M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas Air, $T_{t_c} = 200$ °F

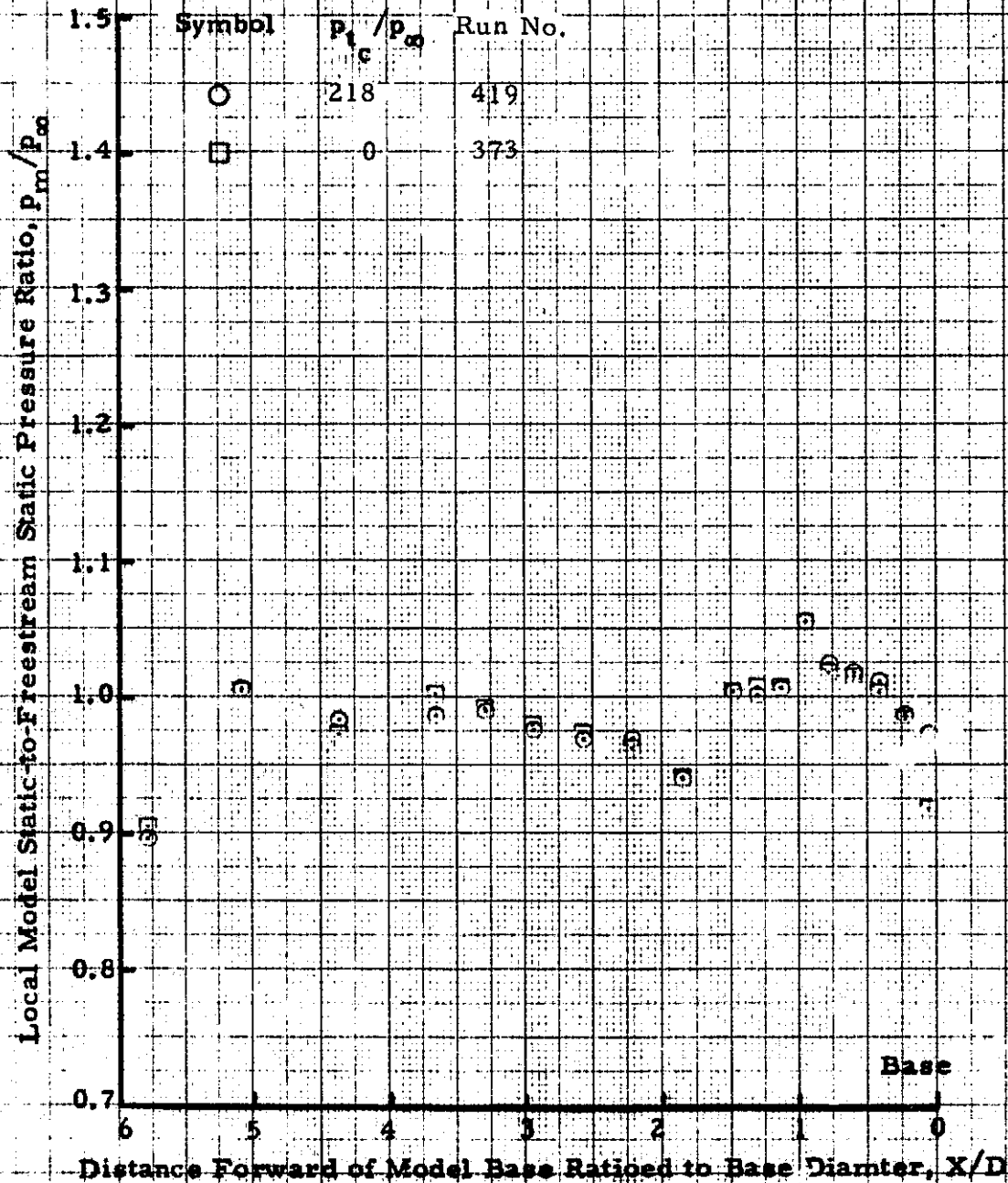


Fig. 57 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 4.0$, $\theta_{lip} = 25$ deg
 $M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas Air, $T_{t_c} = 500$ °F

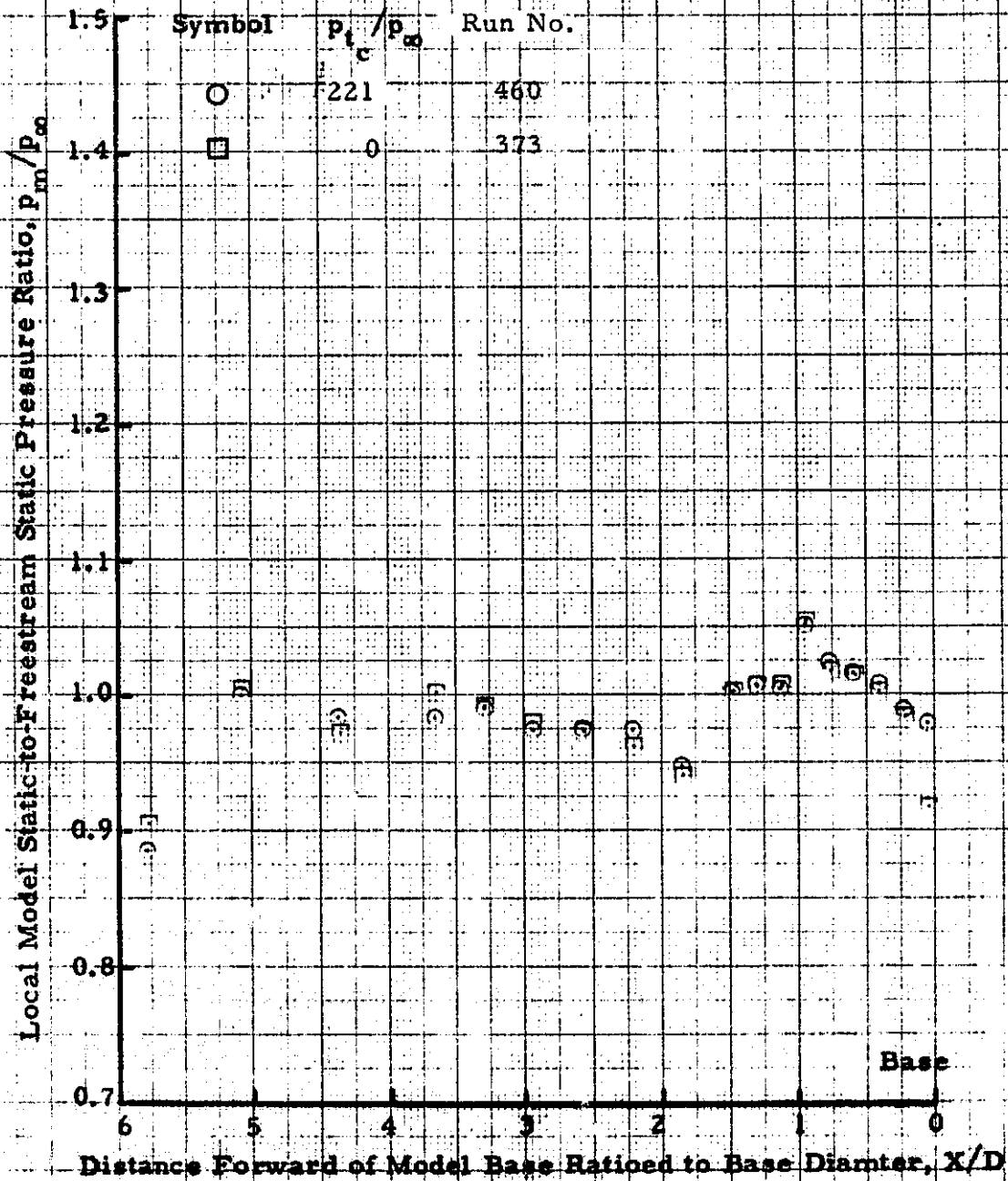


Fig. 58 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = \underline{4.0}$, $\theta_{lip} = \underline{25}$ deg
 $M_\infty = \underline{1.46}$, $p_\infty = \underline{5.1}$ psi, Test Gas Air, $T_{t_c} = \underline{200}$ °F

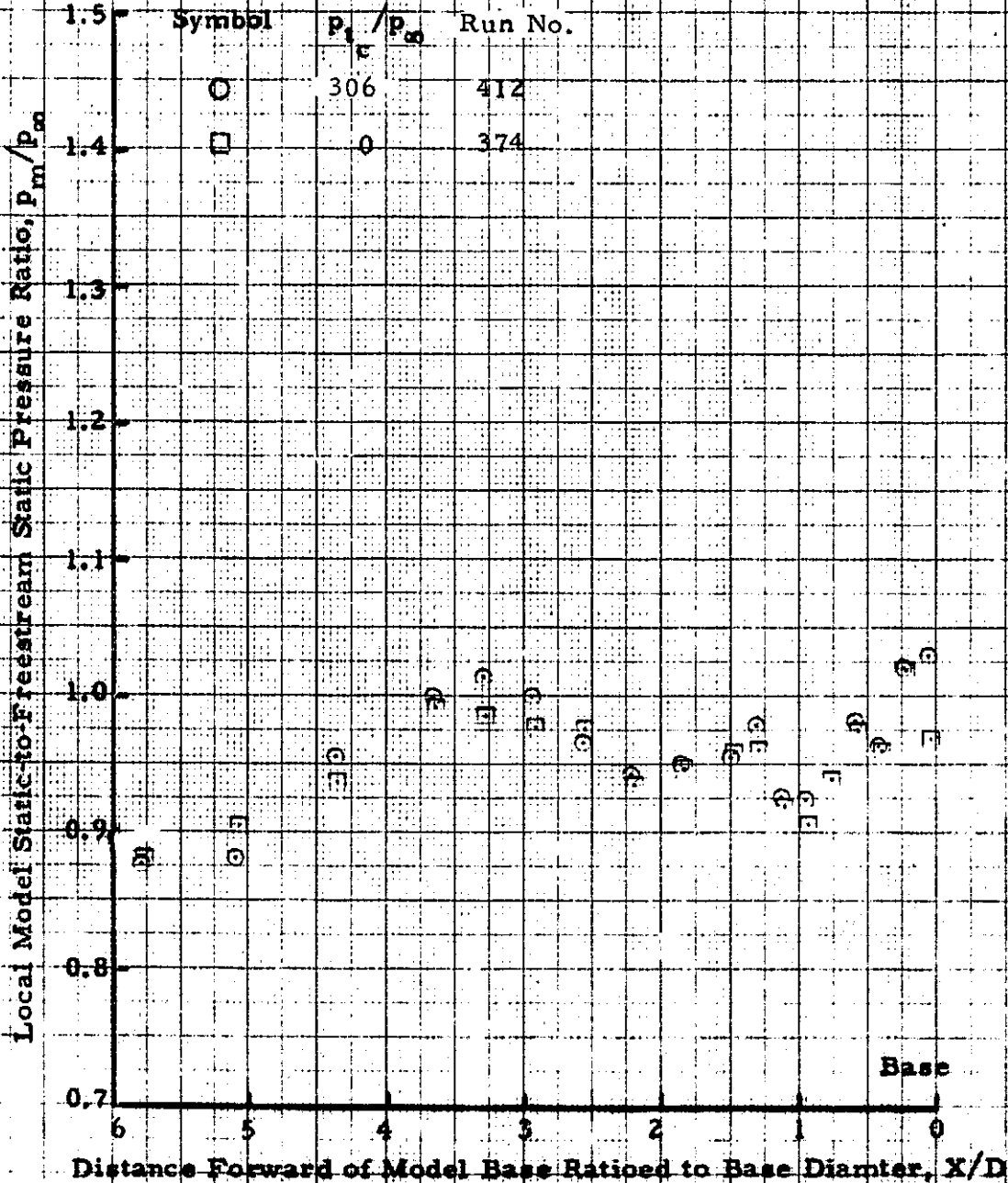


Fig. 59 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 4.0$, $\theta_{lip} = 25$ deg
 $M_\infty = 1.46$, $p_\infty = 5.1$ psi, Test Gas Air, $T_{t_c} = 500$ °F

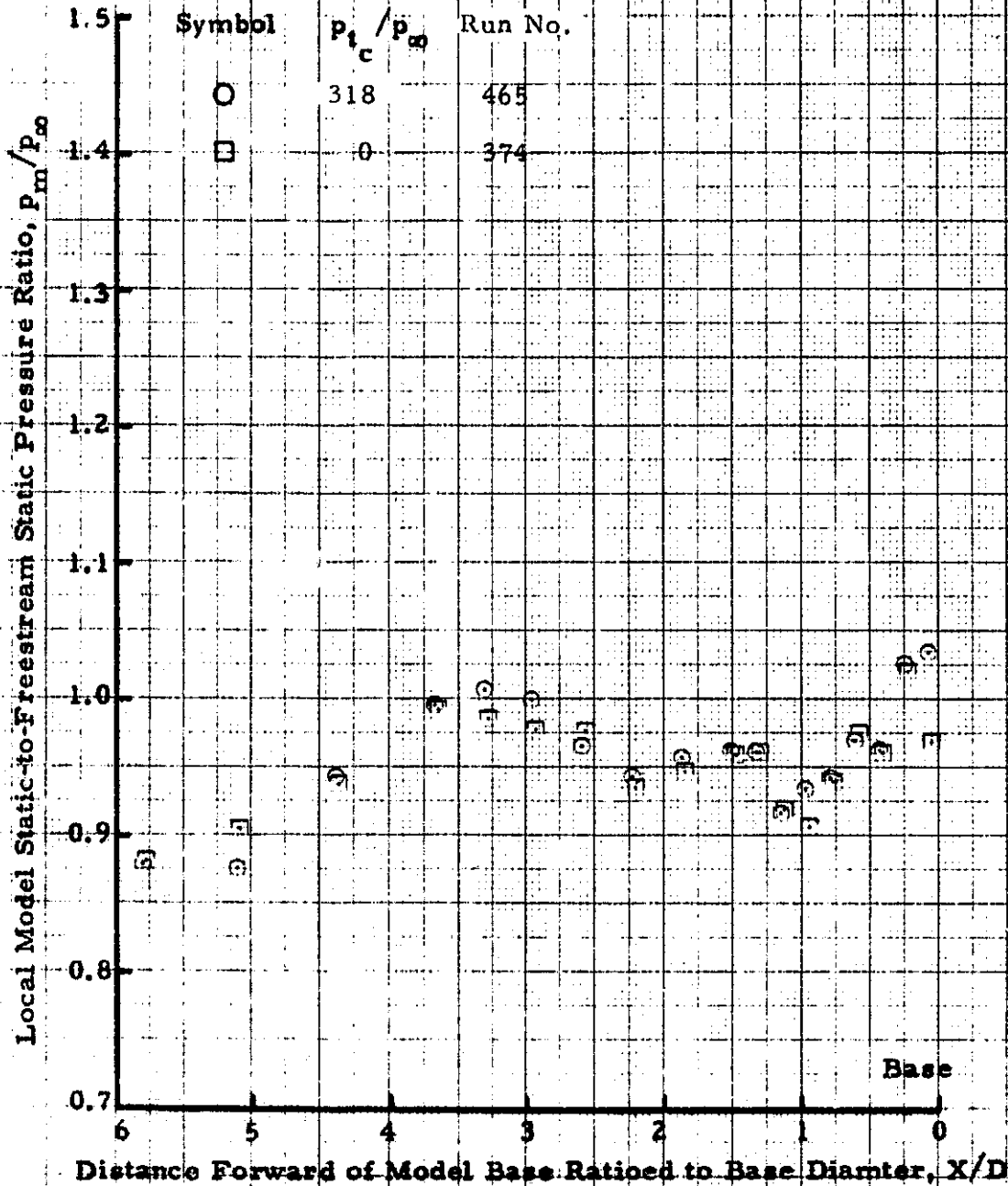


Fig. 60 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* =$ 4.0, $\theta_{lip} =$ 25 deg
 $M_\infty =$ 3.48, $p_\infty =$ 1.2 psi, Test Gas Air, $T_{t_c} =$ 200 °F

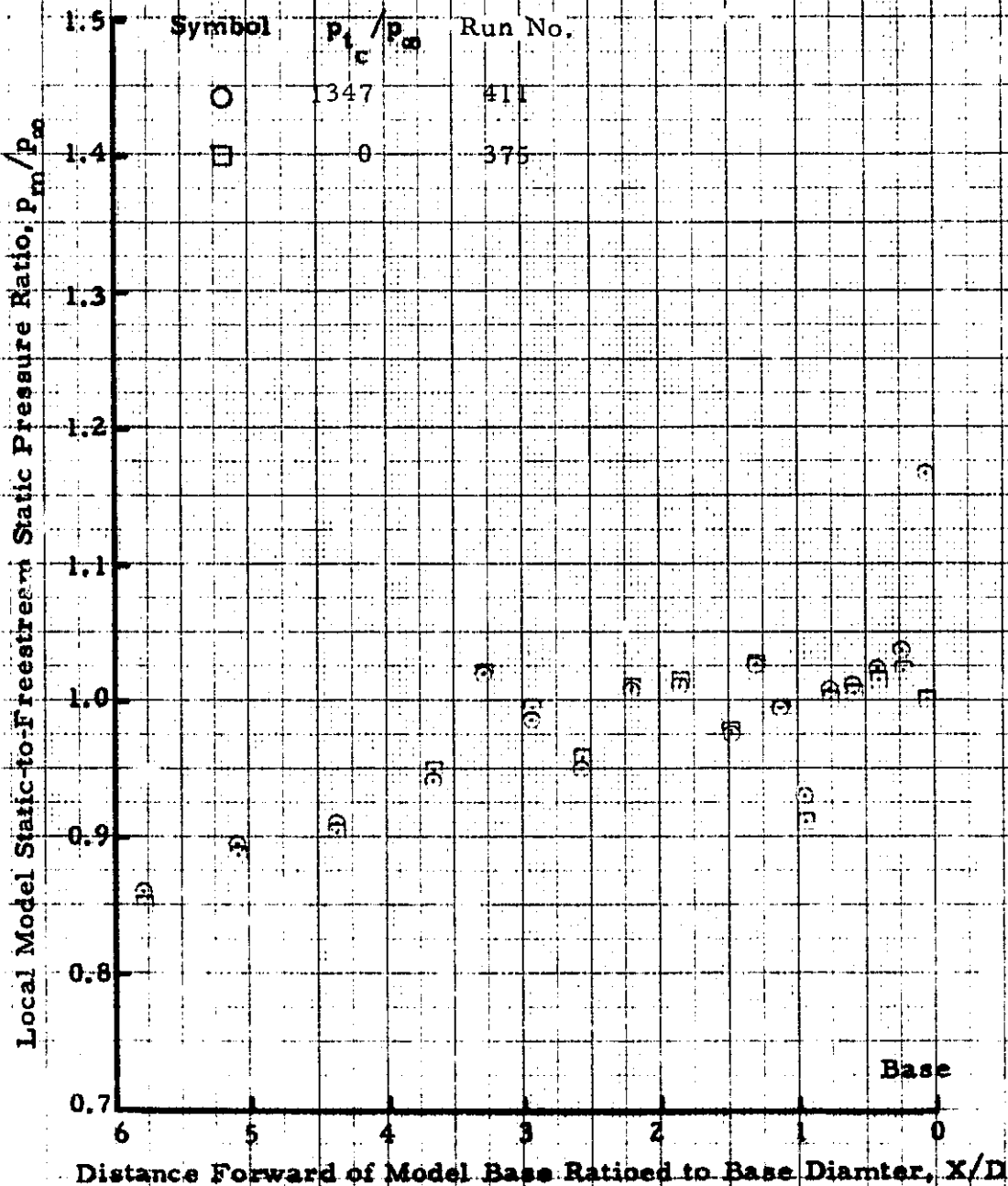


Fig. 61 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 4.0$, $\theta_{lip} = 25$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas Air, $T_{t_c} = 500$ °F

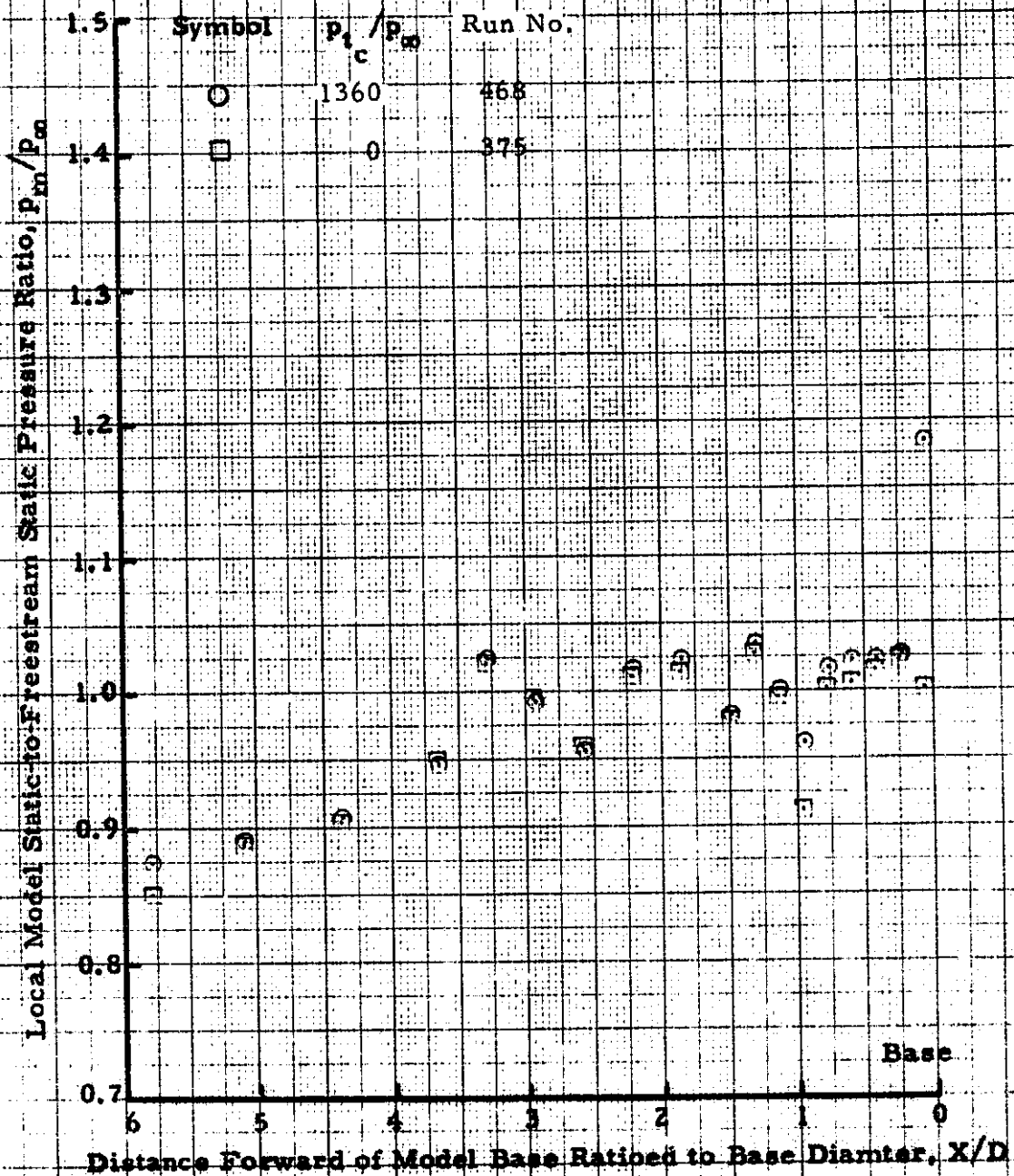


Fig. 62 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg
 $M_\infty = 0.9$, $P_\infty = 10.7$ psi, Test Gas CF₄, $T_{t_c} = 400$ °F

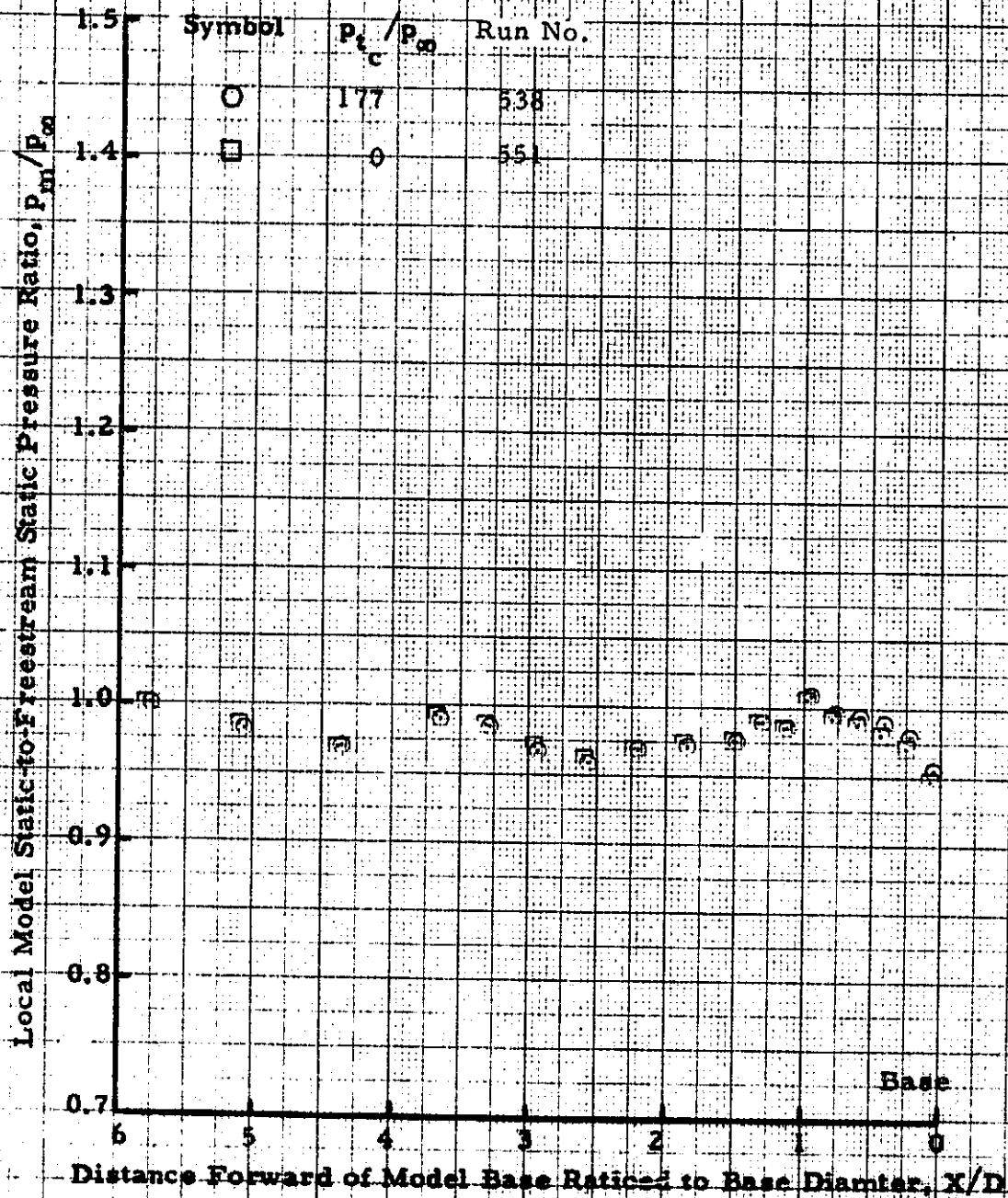


Fig. 63 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg
 $M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas CF₄, $T_{t_c} = 400$ °F

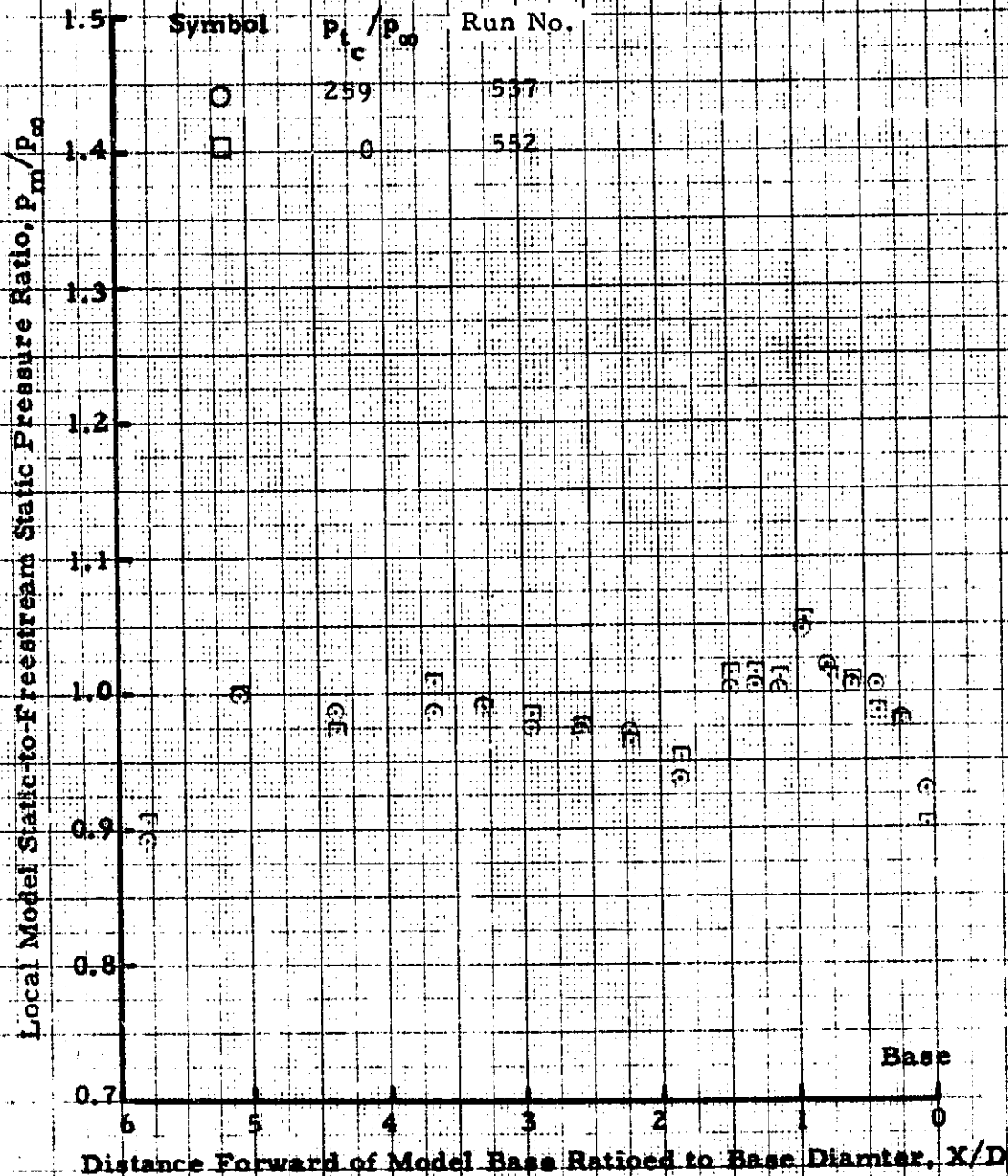


Fig. 64 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg
 $M_\infty = 1.46$, $p_\infty = 5.1$ psi, Test Gas CF₄, $T_{t_c} = 400$ °F

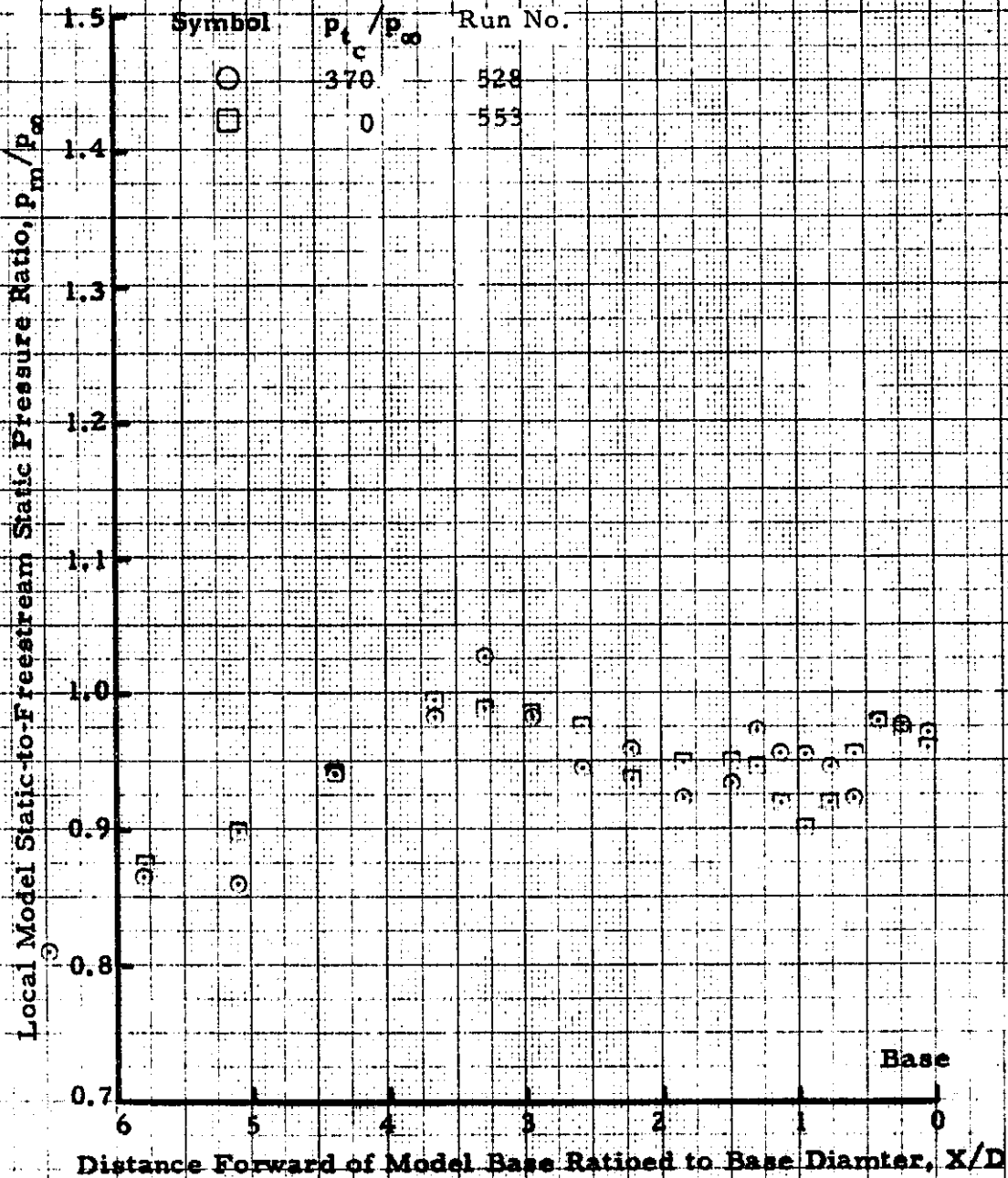


Fig. 65 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas CF4, $T_{t_c} = 400$ °F

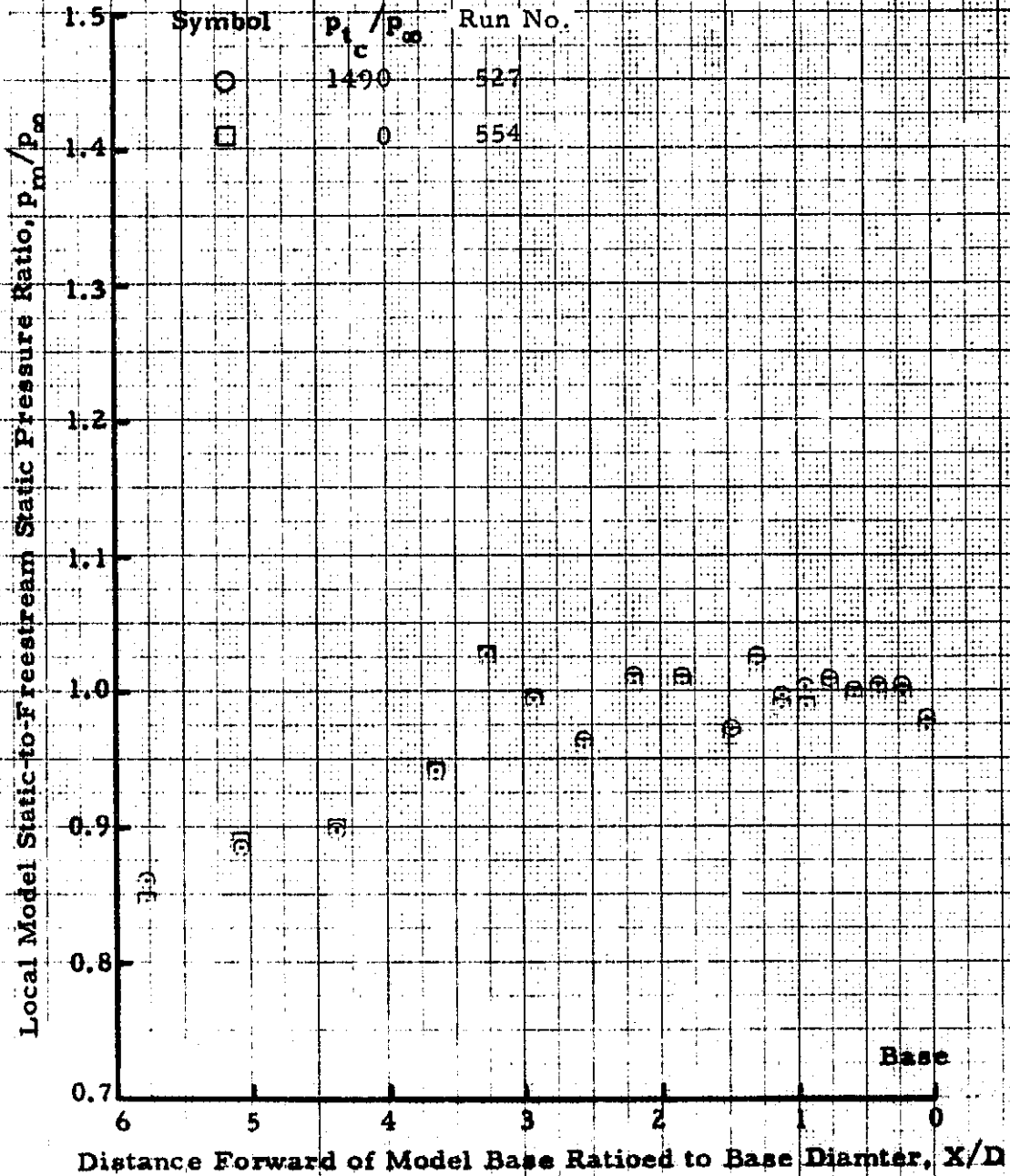


Fig. 66 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg
 $M_\infty = 0.9$, $P_\infty = 10.7$ psi, Test Gas CF₄, $T_{t_c} = 400$ °F

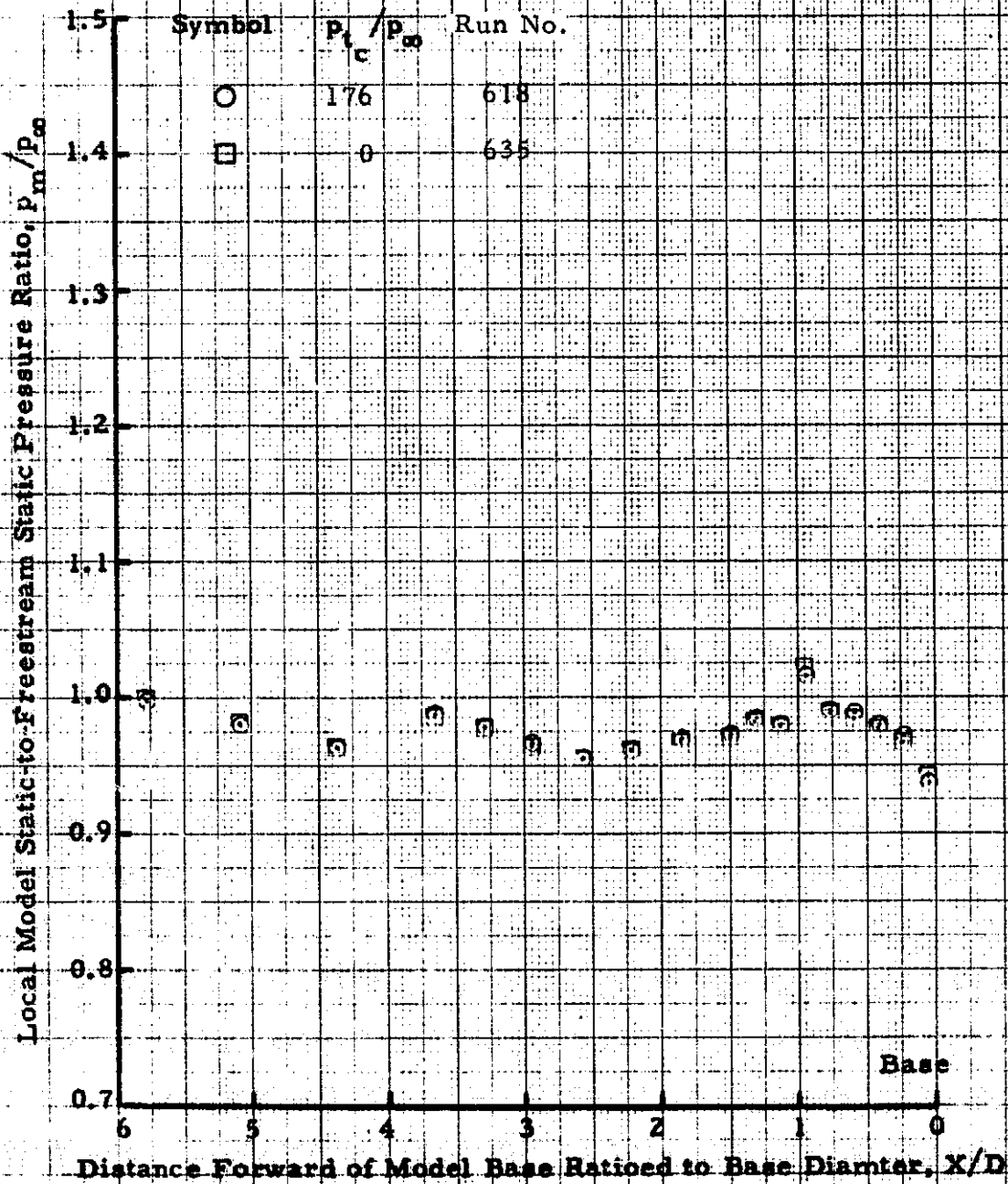


Fig. 67 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg
 $M_\infty = 1.2$, $p_\infty = 7.4$ psi, Test Gas CF₄, $T_{t_c} = 400$ °F

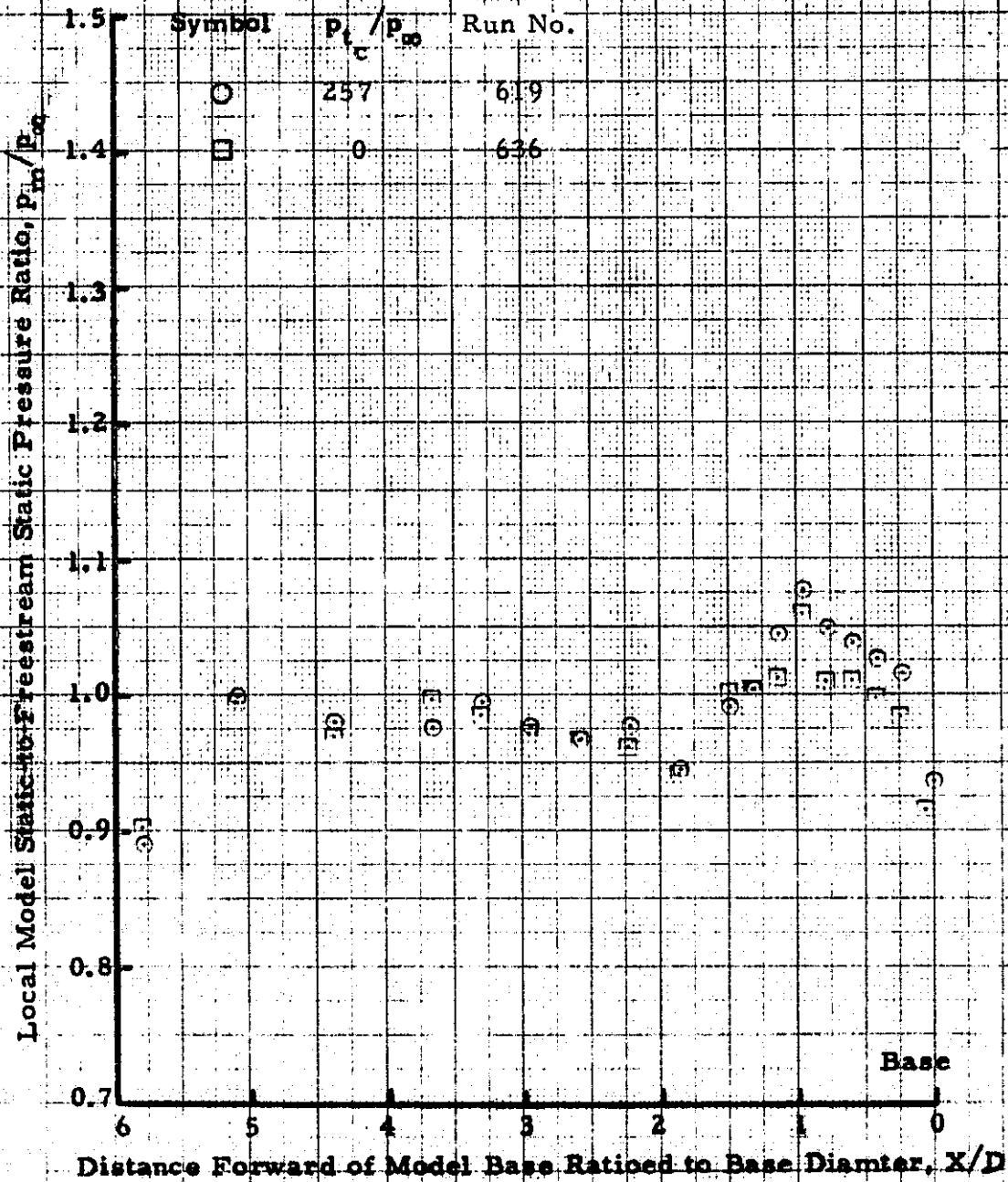


Fig. 68 - Model Surface Pressure Distribution

Nozzle Config. Triple, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg
 $M_\infty = 1.46$, $p_\infty = 5.1$ psi, Test Gas CF₄, $T_{t_c} = 400$ °F

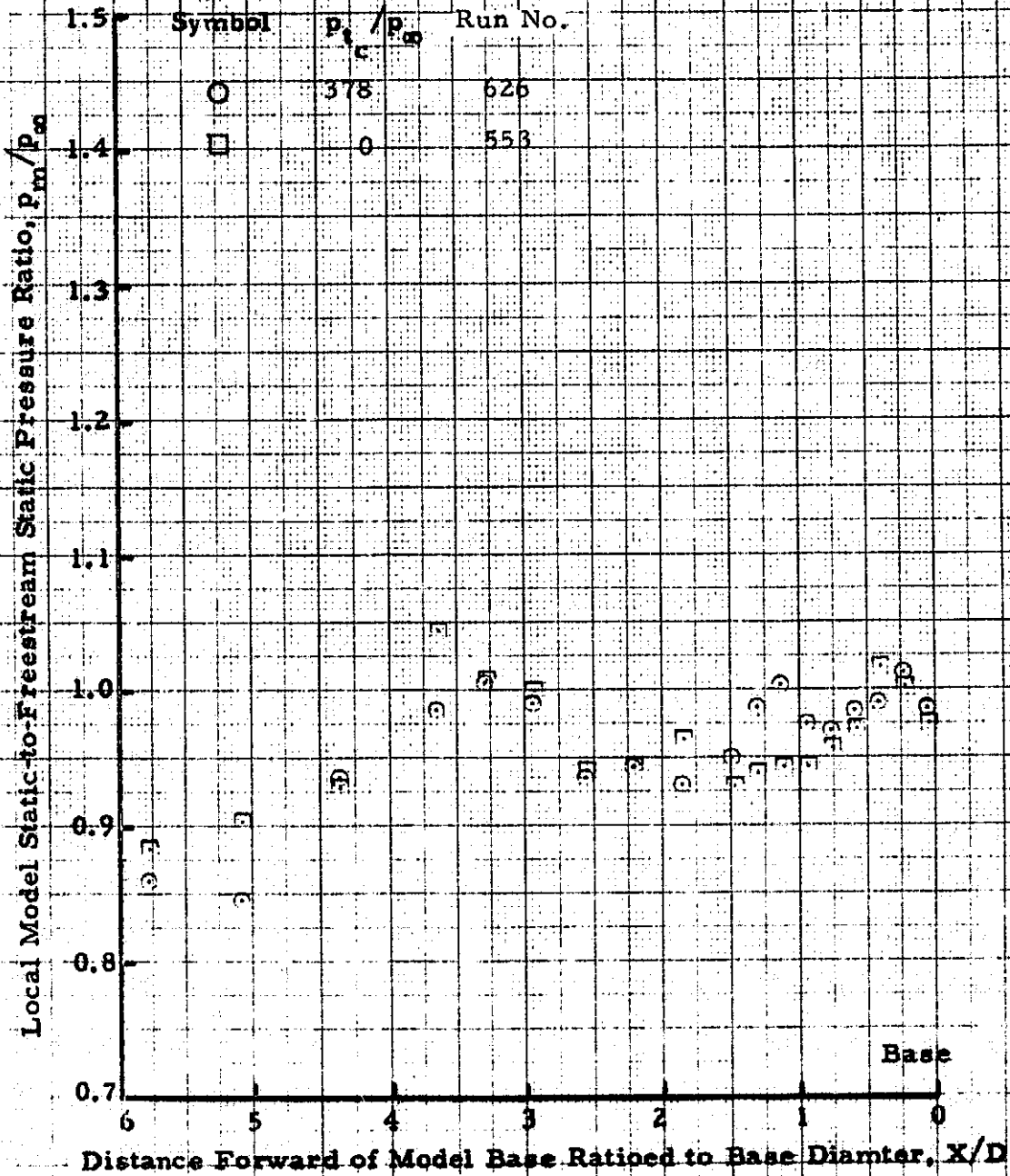


Fig. 69 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas Air, $T_{t_c} = 100$ °F

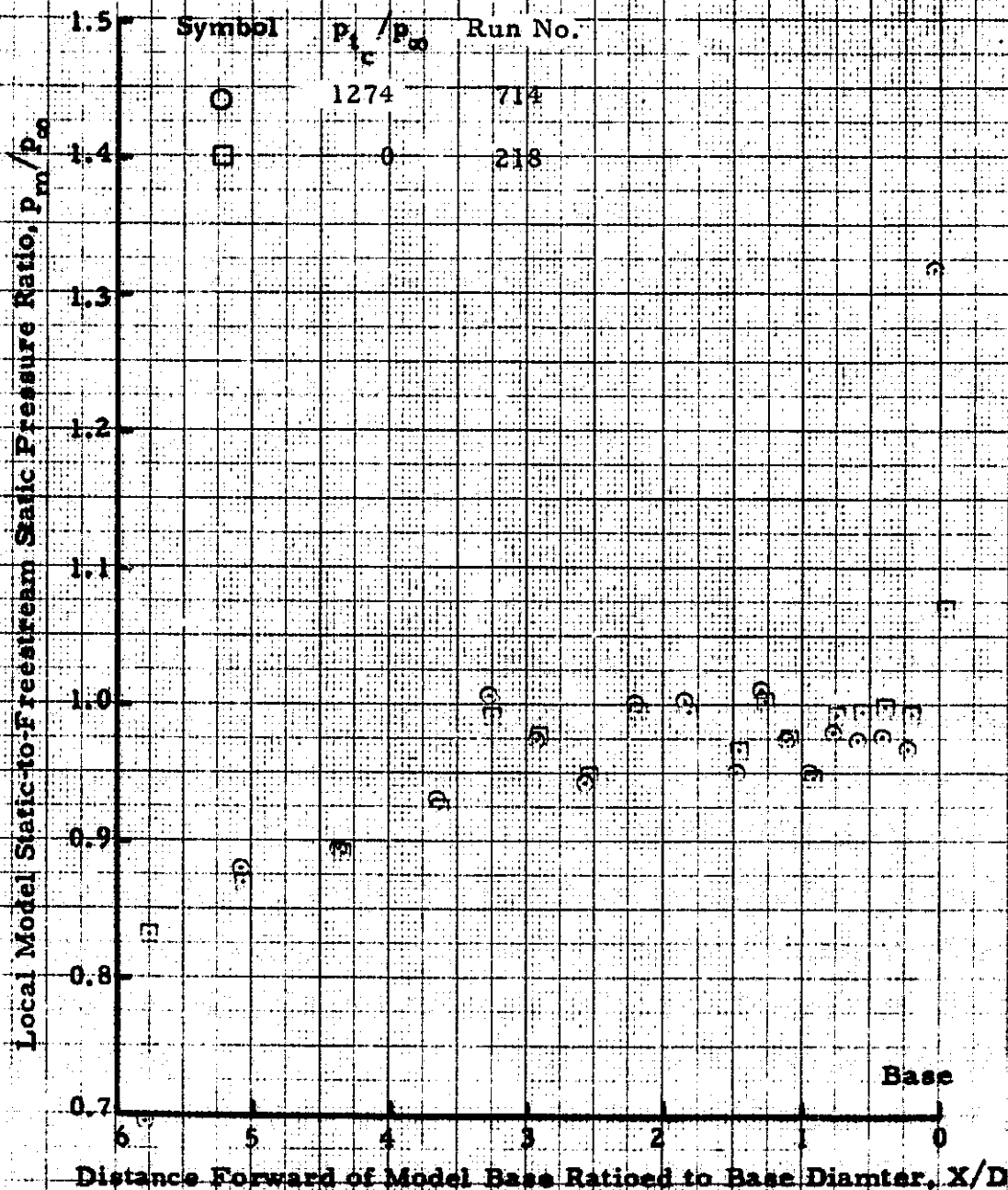


Fig. 70 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 35$ deg
 $M_\infty = 3.48$, $p_\infty = 1.2$ psi, Test Gas Air, $T_{t_c} = 500$ °F

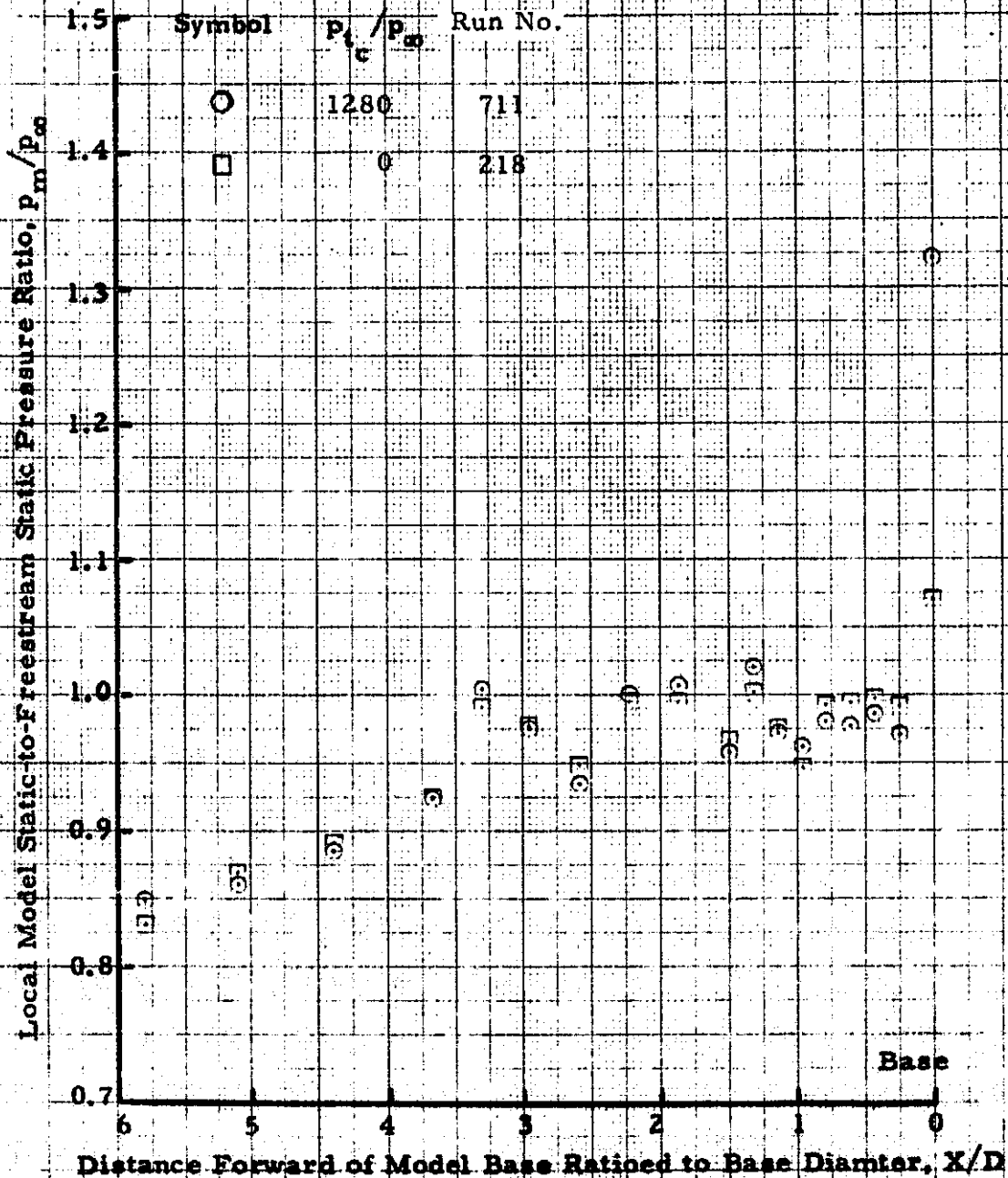


Fig. 71 - Model Surface Pressure Distribution

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg.
 Test Gas Air, $M_\infty = 0.9$, $p_\infty = 10.7$ psi
 Pressure Tap No. 39

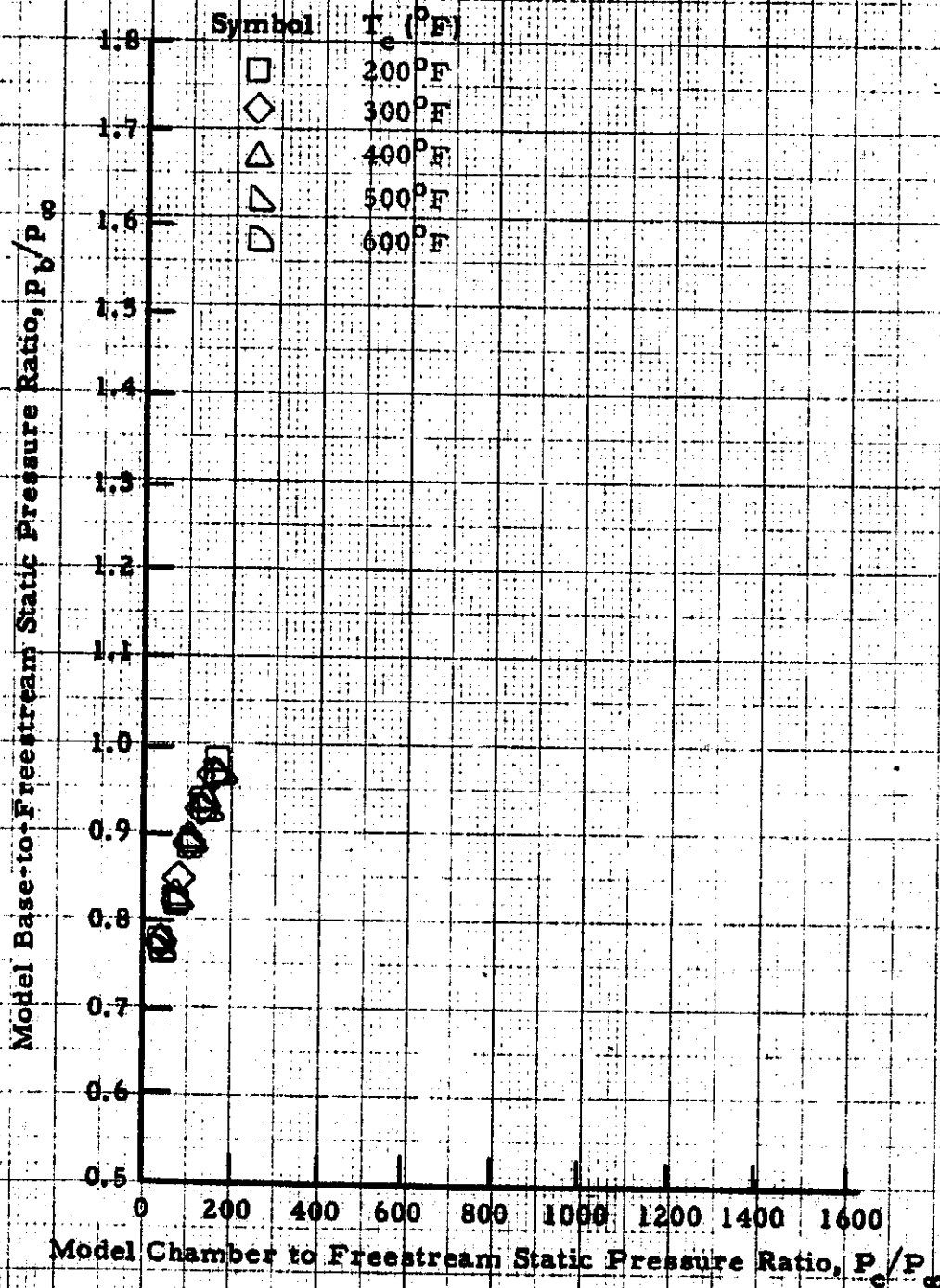


Fig. 72 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg,
 Test Gas Air, $M_\infty = 1.2$, $p_\infty = 7.4$ psi
 Pressure Tap No. 39

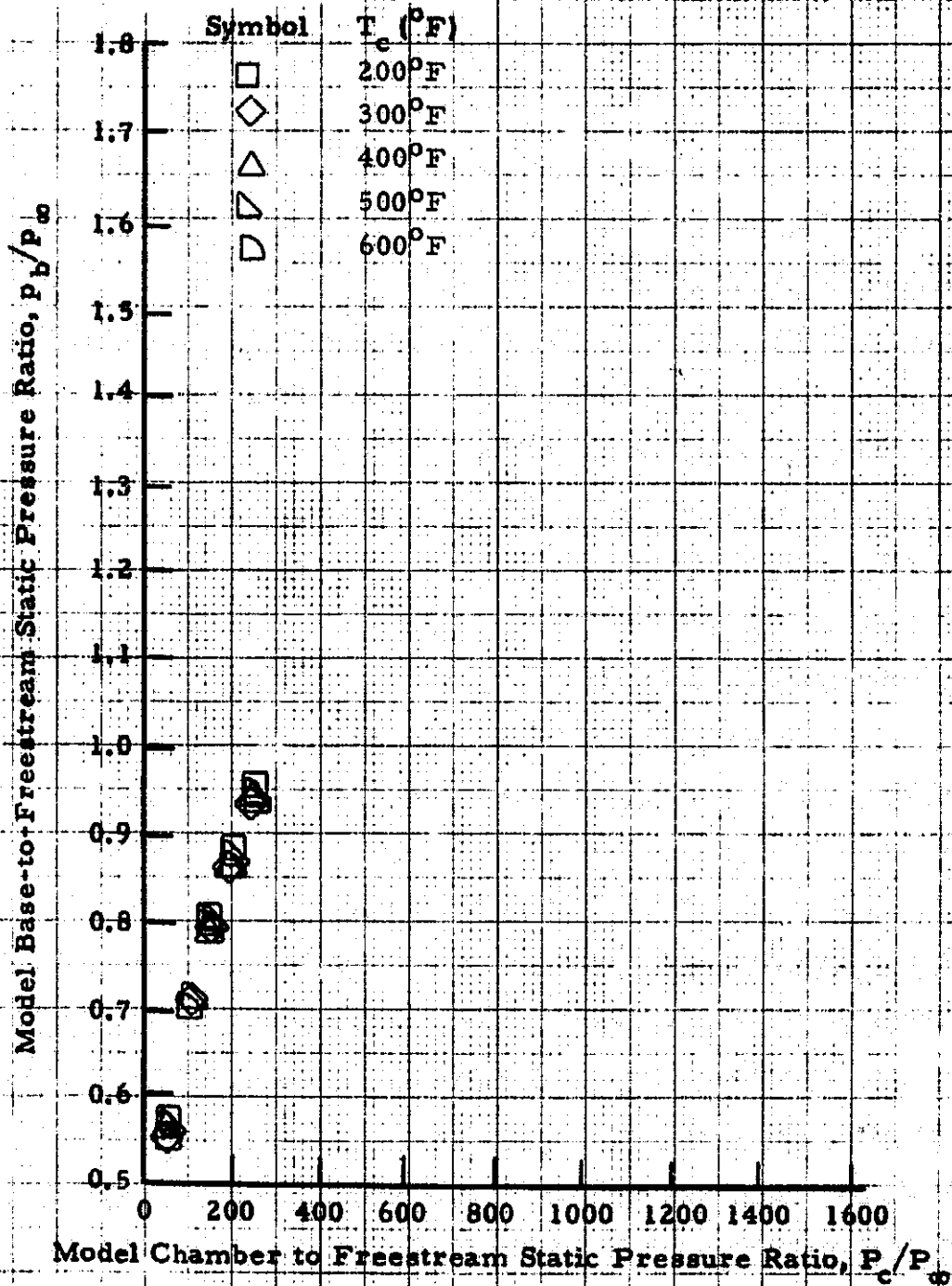


Fig. 73. - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = 6.5$, $\theta_{lip} = 35$ deg,
 Test Gas Air, $M_\infty = 1.46$, $p_\infty = 5.1$ psi
 Pressure Tap No. 39

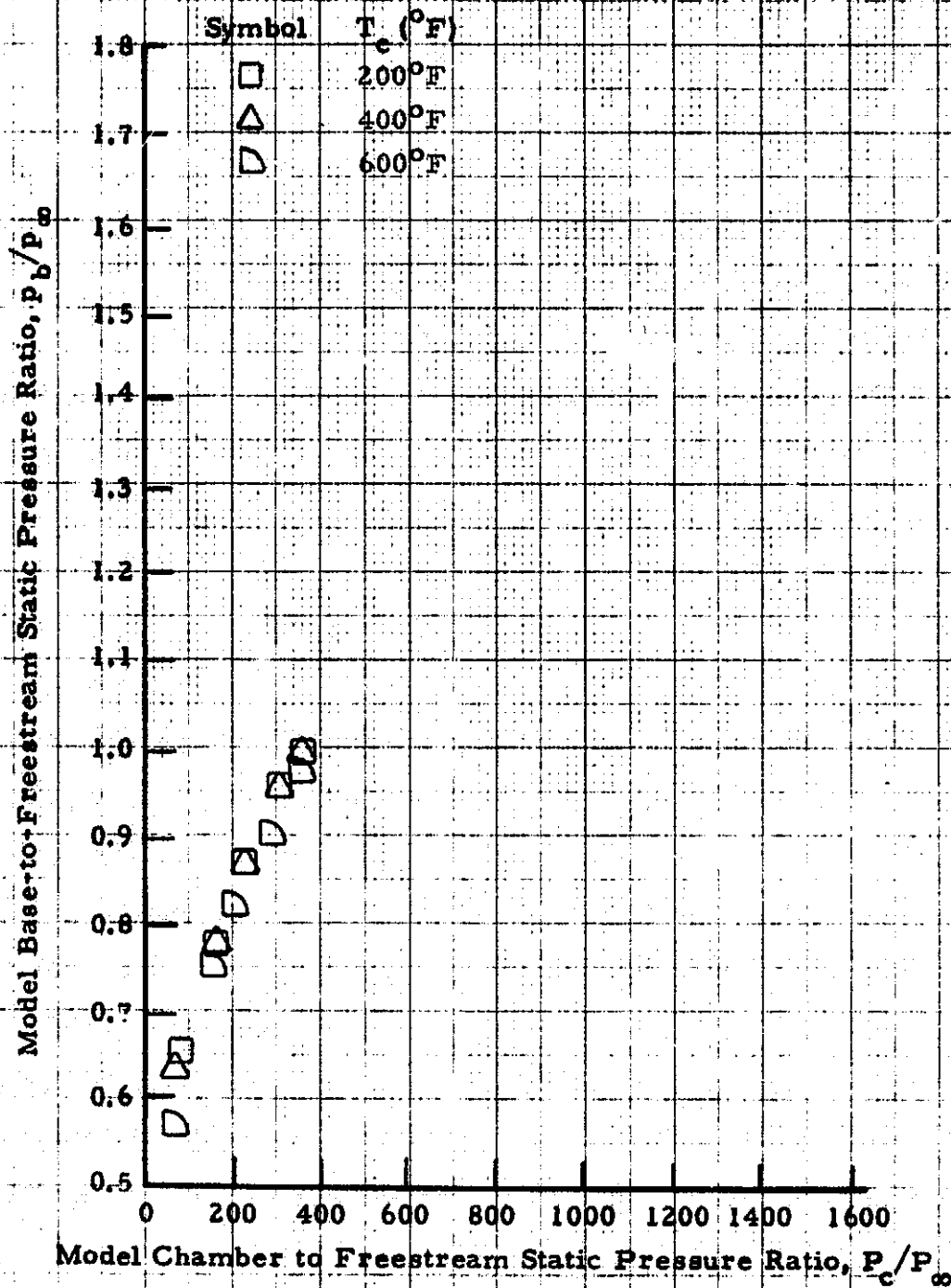


Fig. 74 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* =$ 6.5, $\theta_{lip} =$ 35 deg,
 Test Gas Air, $M_\infty =$ 3.48, $p_\infty =$ 1.2 psi
 Pressure Tap No. 39

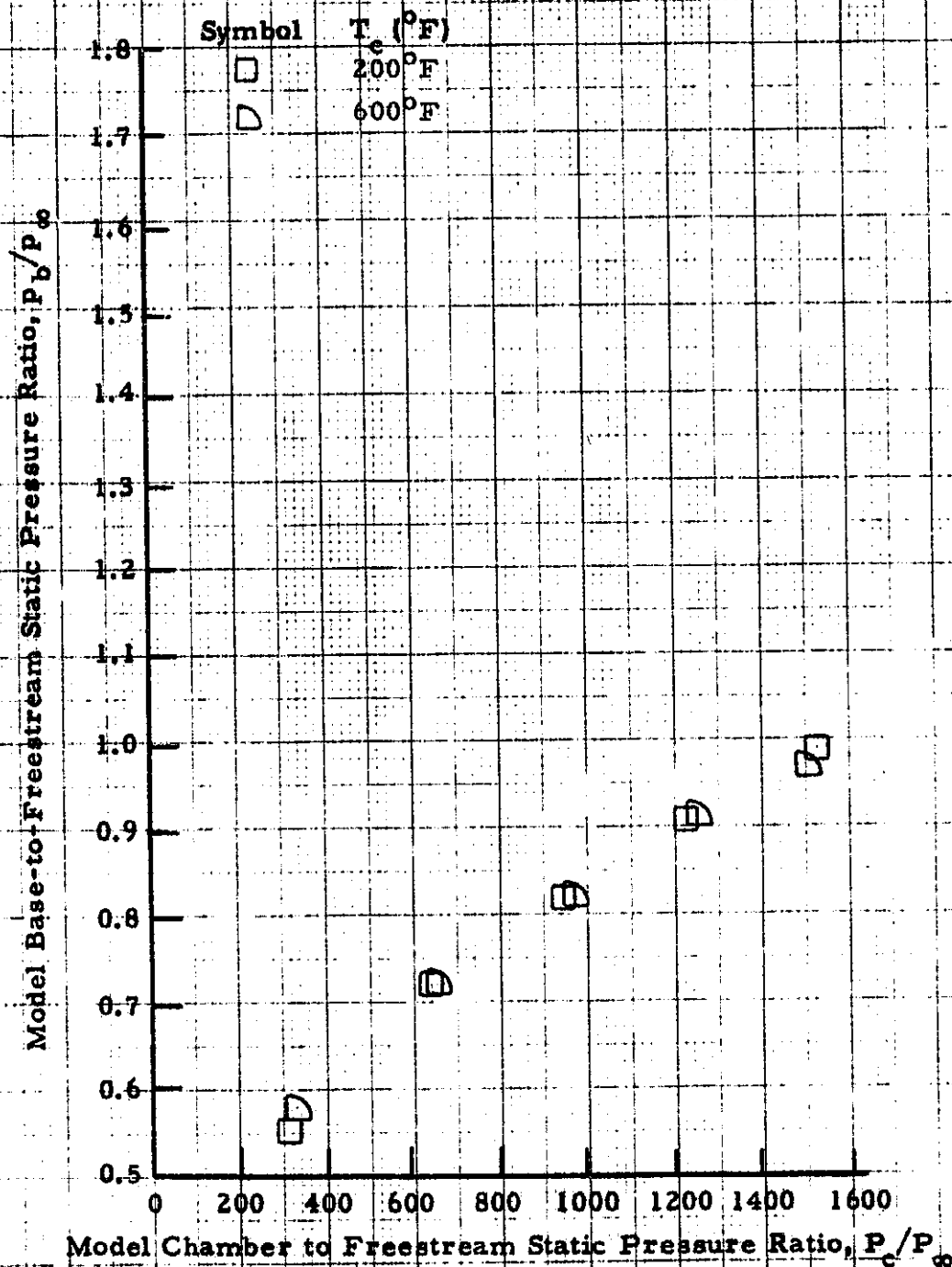


Fig. 75 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = \underline{3.5}$, $\theta_{lip} = \underline{25}$ deg,
 Test Gas Air, $M_\infty = \underline{0.9}$, $p_\infty = \underline{10.7}$ psi
 Pressure Tap No. 39

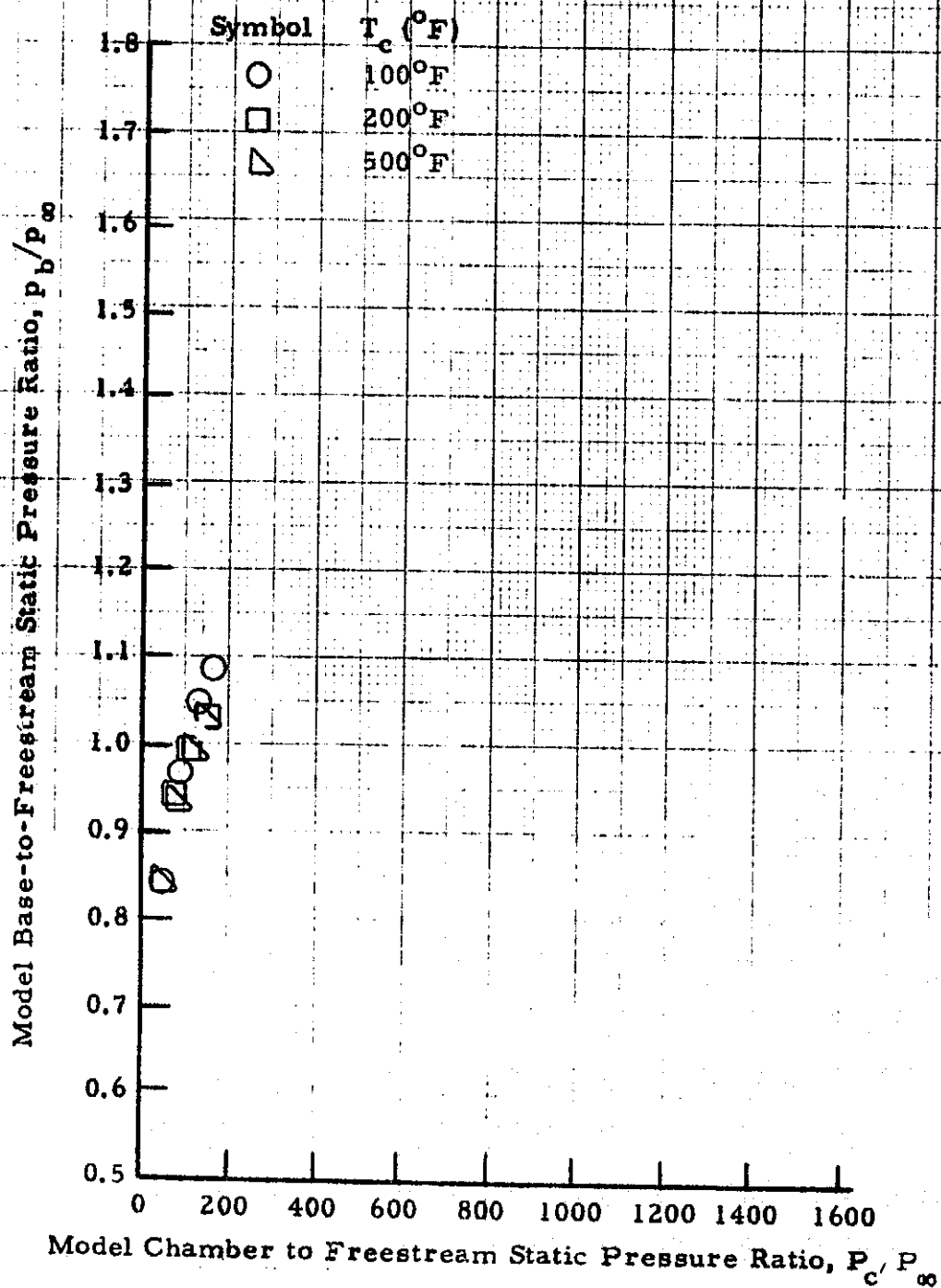


Fig. 76 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = \underline{3.5}$, $\theta_{lip} = \underline{25}$ deg,
 Test Gas Air, $M_\infty = \underline{1.2}$, $p_\infty = \underline{7.4}$ psi
 Pressure Tap No. 39

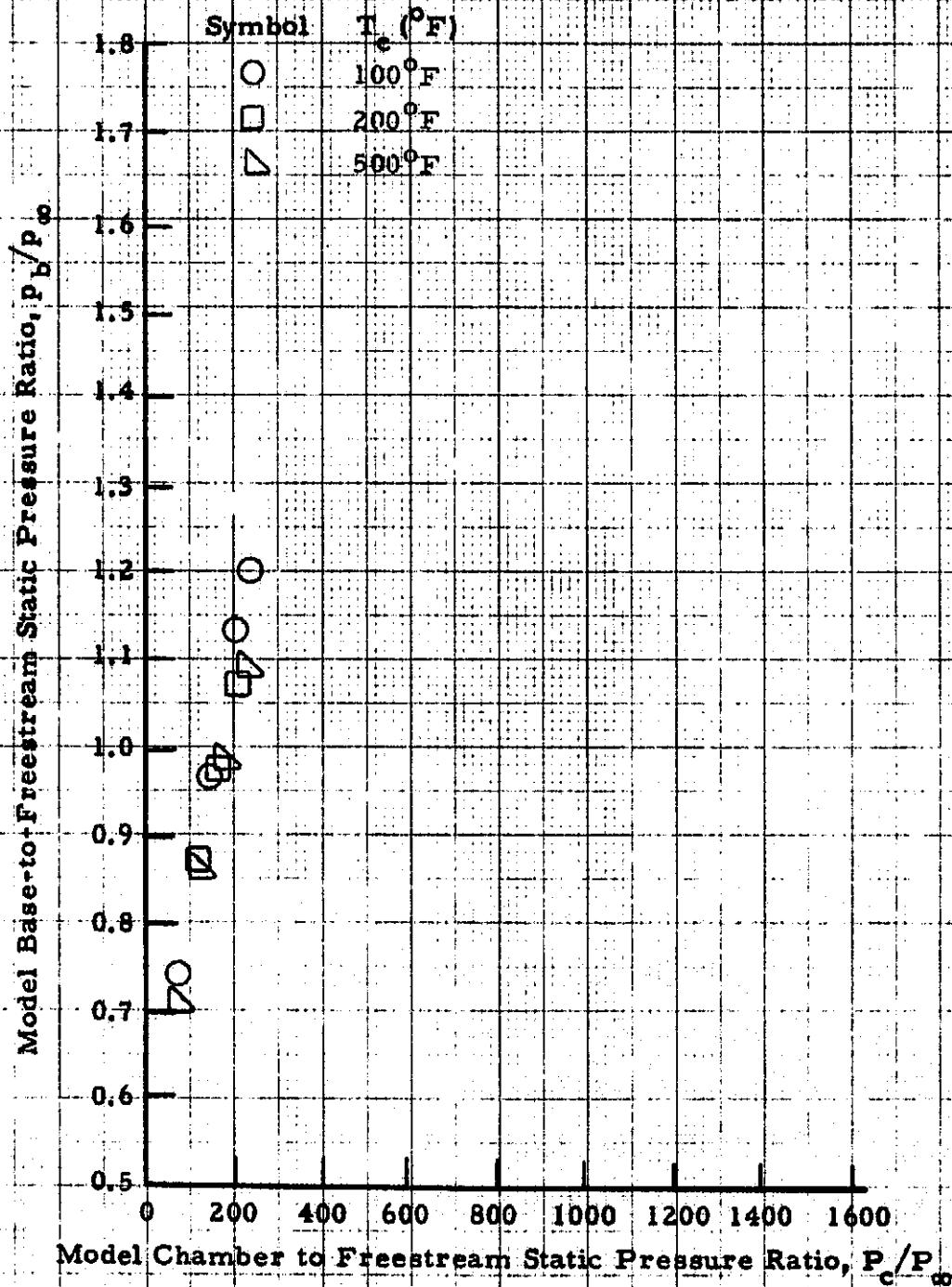


Fig. 77 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg.
 Test Gas Air, $M_\infty = 1.46$, $p_\infty = 5.1$ psi
 Pressure Tap No. 39

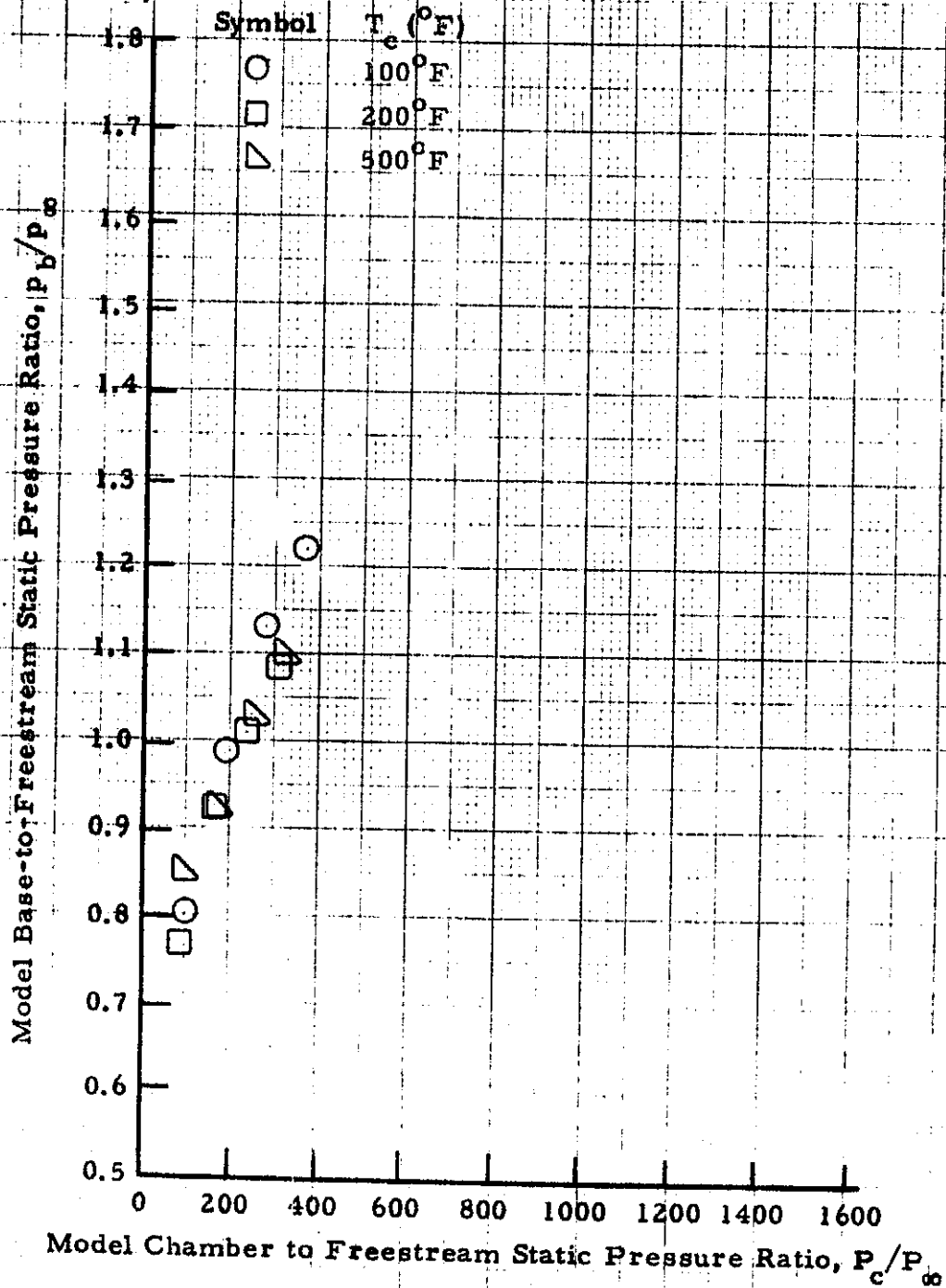


Fig. 78 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 25$ deg,
 Test Gas Air, $M_\infty = 3.48$, $p_\infty = 1.2$ psi
 Pressure Tap No. 39

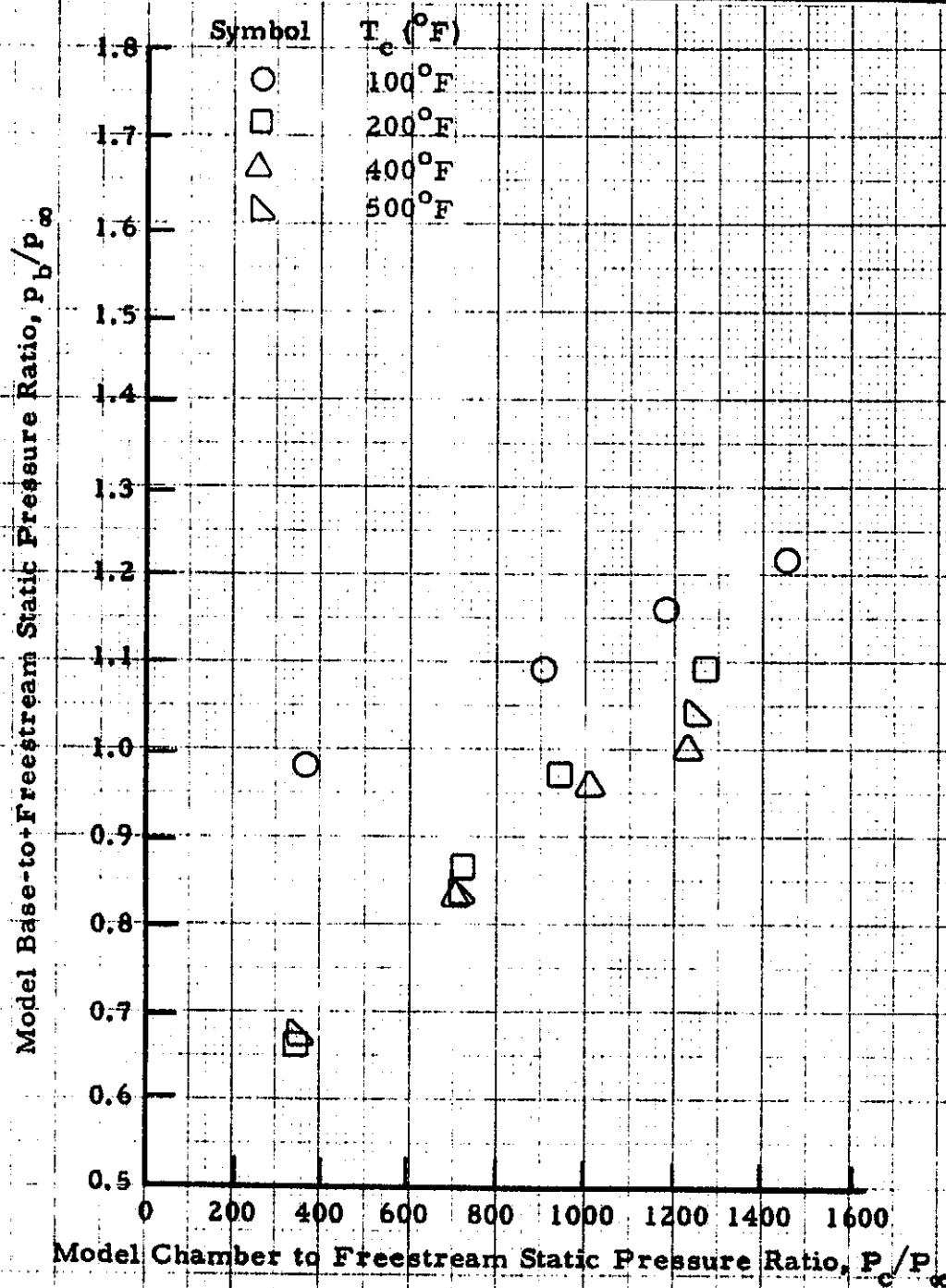


Fig. 79 -- Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = 3.5$, $\theta_{lip} = 35$ deg,
 Test Gas Air, $M_\infty = 3.48$, $P_\infty = 1.2$ psi
 Pressure Tap No. 39

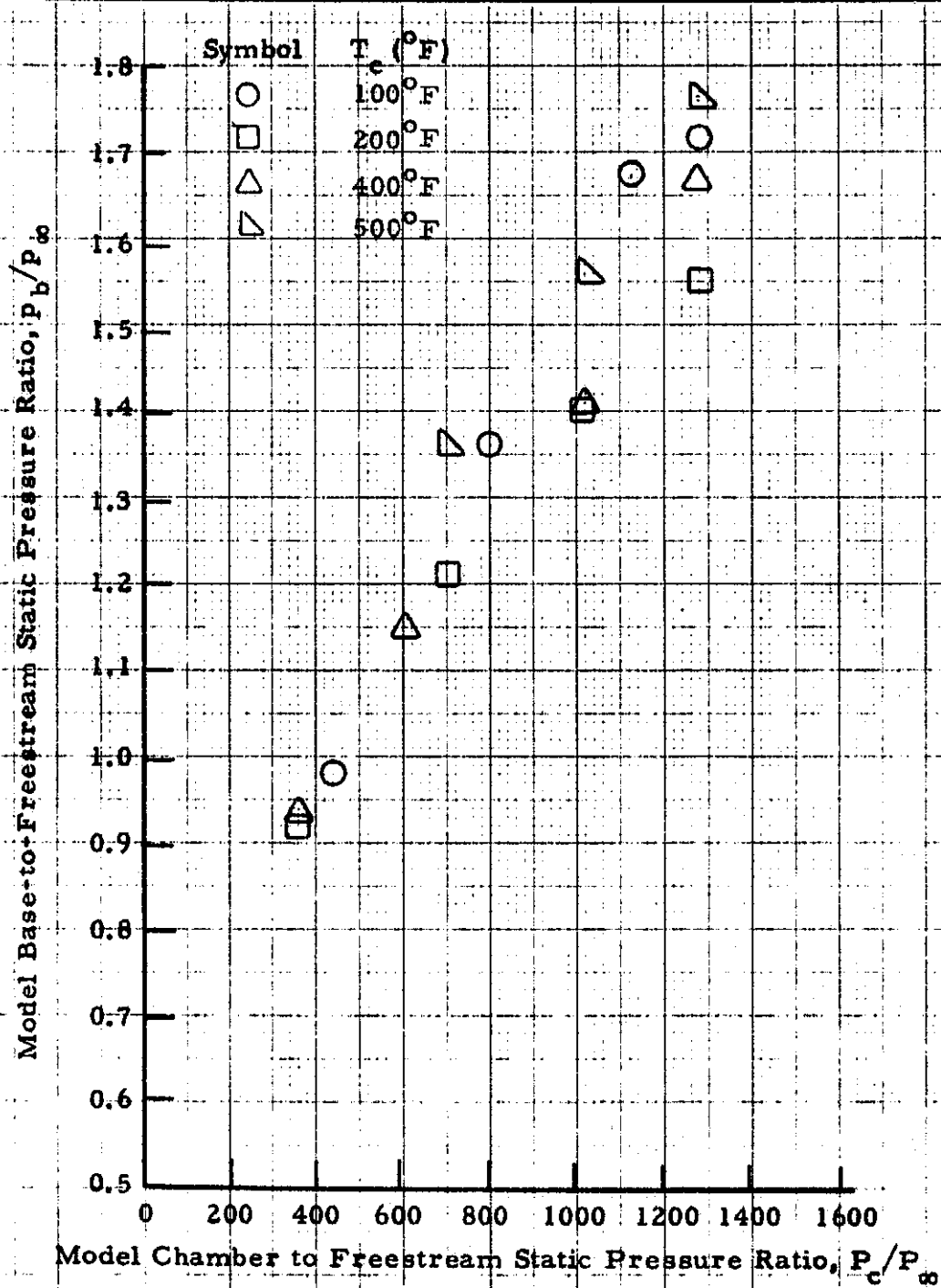


Fig. 80 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* =$ 4.0, $\theta_{lip} =$ 25 deg,
 Test Gas Air, $M_\infty =$ 0.9, $p_\infty =$ 10.7 psi
 Pressure Tap No. 39

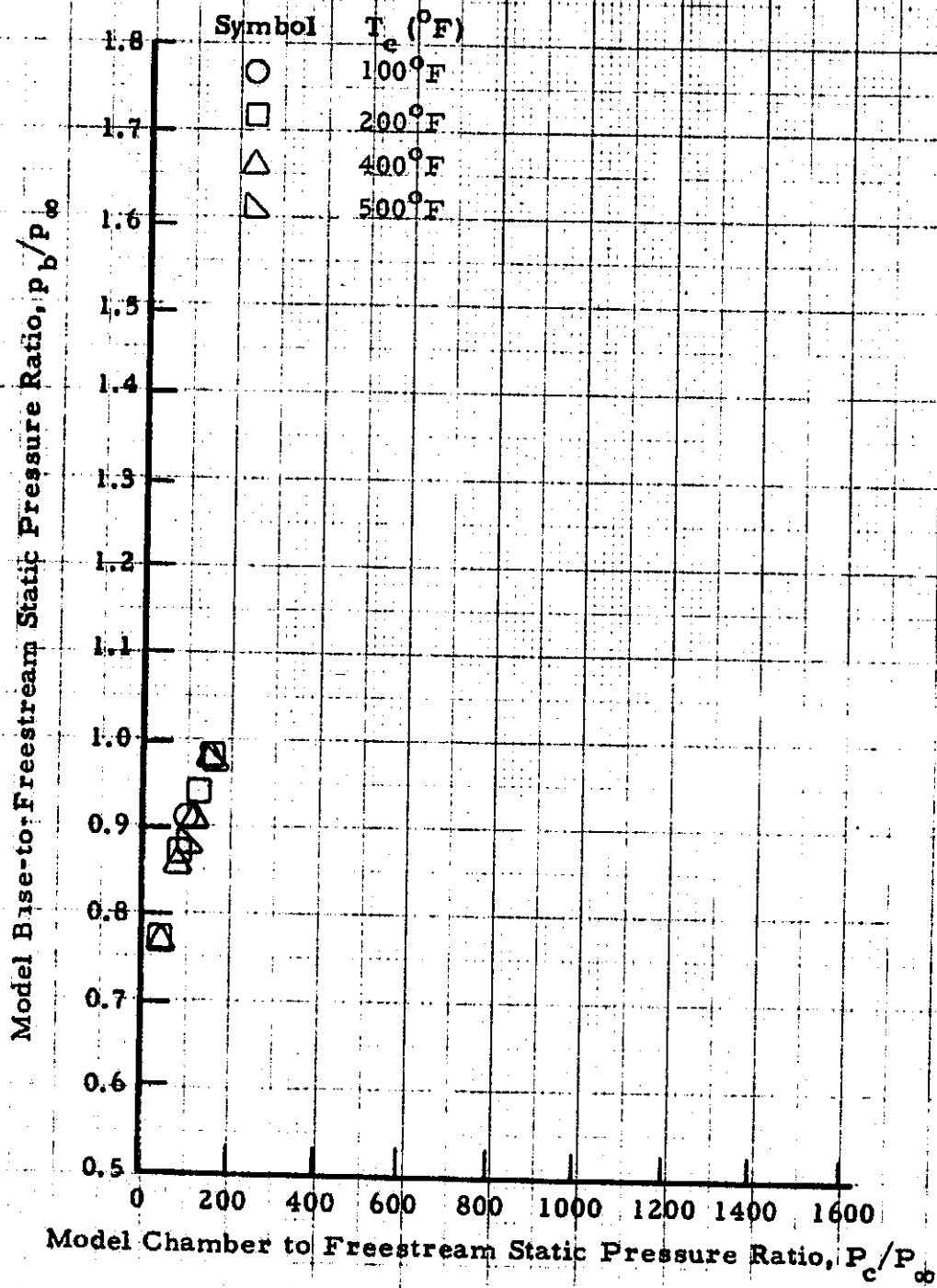


Fig. 81 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* =$ 4.0, $\theta_{lip} =$ 25 deg,
 Test Gas Air, $M_\infty =$ 1.2, $P_\infty =$ 7.4 psi
 Pressure Tap No. 39

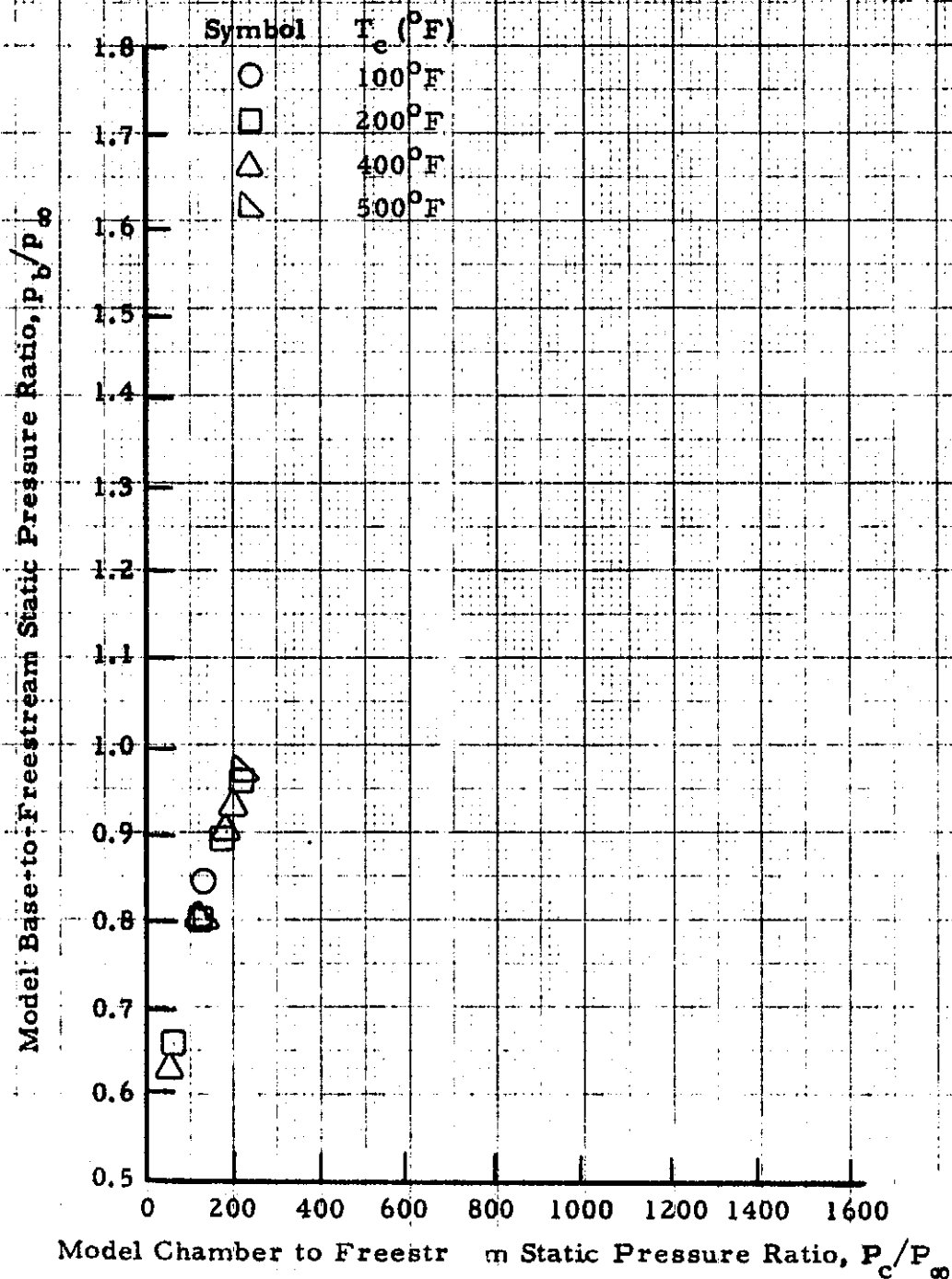


Fig. 82 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* = \underline{4.0}$, $\theta_{lip} = \underline{25}$ deg,
 Test Gas Air, $M_\infty = \underline{1.46}$, $P_\infty = \underline{5.1}$ psi
 Pressure Tap No. 39

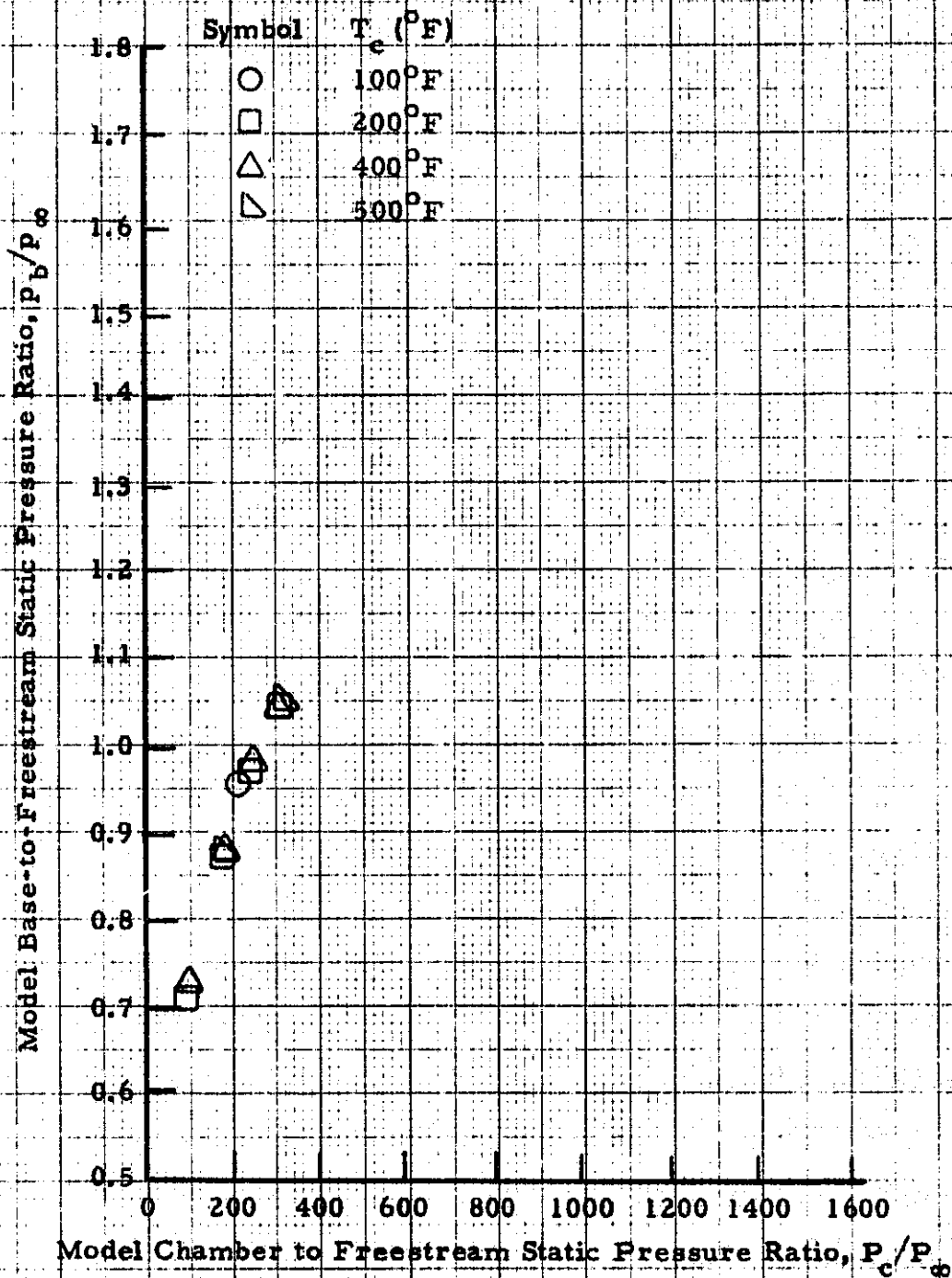


Fig. 83 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* = \underline{4.0}$, $\theta_{lip} = \underline{25}$ deg,
 Test Gas Air, $M_\infty = \underline{3.48}$, $P_\infty = \underline{1.2}$ psi
 Pressure Tap No. 39

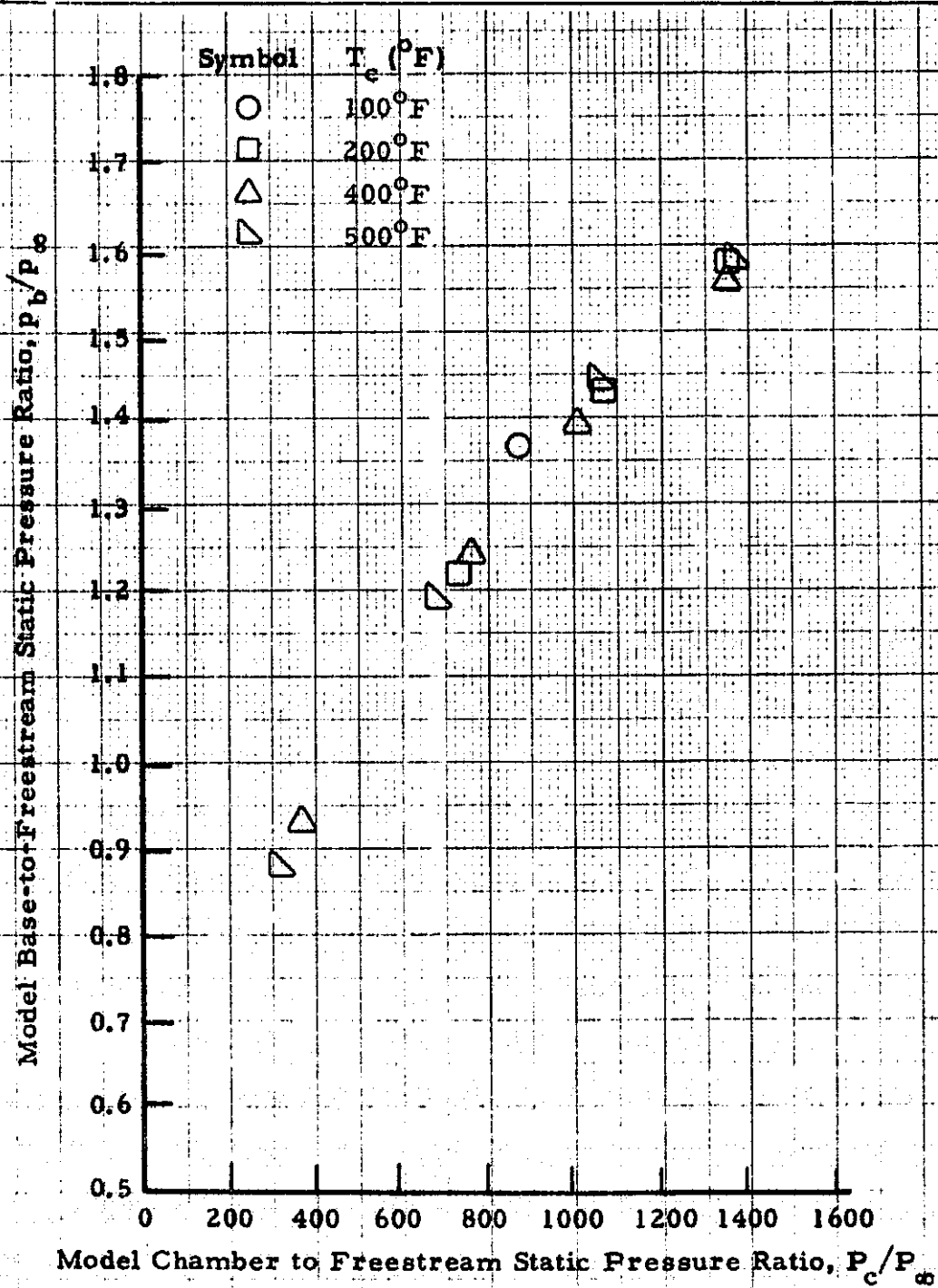


Fig. 84 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* =$ 8.0, $\theta_{lip} =$ 15 deg,
 Test Gas CF₄, $M_\infty =$ 0.9, $p_\infty =$ 10.7 psi
 Pressure Tap No. 39

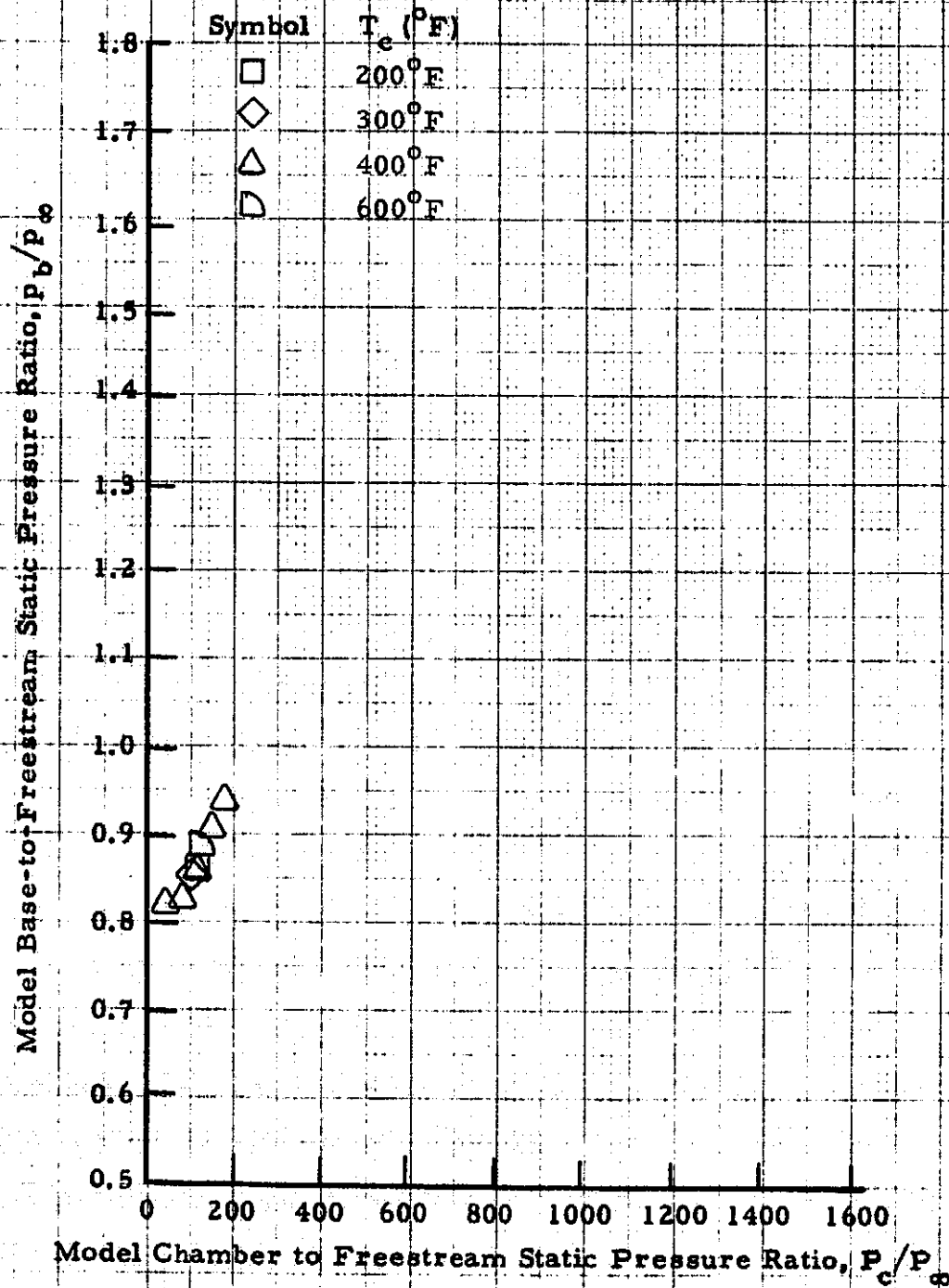


Fig. 85 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = \underline{8.0}$, $\theta_{lip} = \underline{15}$ deg,
 Test Gas CF₄, $M_\infty = \underline{1.2}$, $p_\infty = \underline{7.4}$ psi
 Pressure Tap No. 39

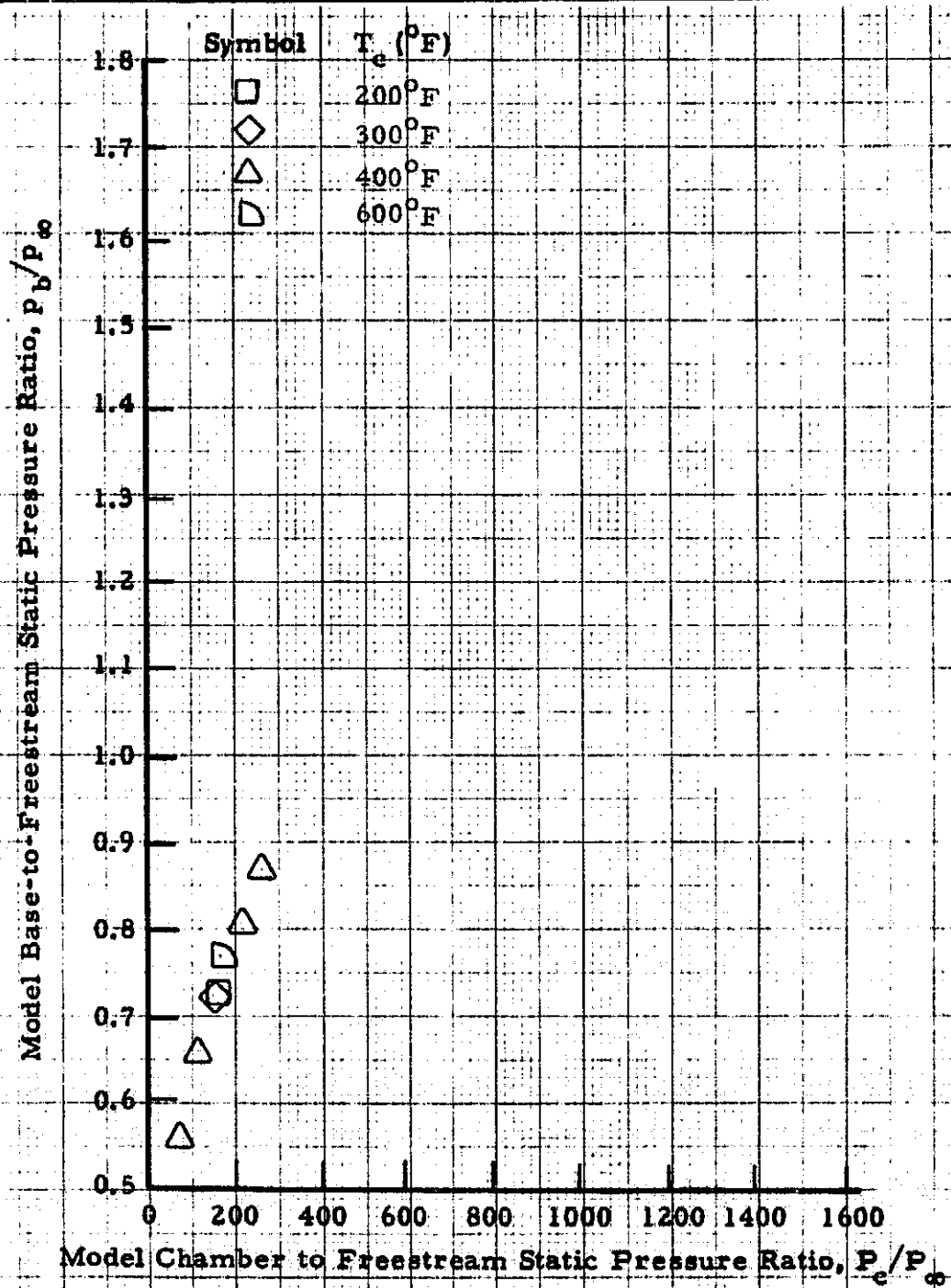


Fig. 86 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg,
 Test Gas CF₄, $M_\infty = 1.46$, $p_\infty = 5.1$ psi
 Pressure Tap No. 39

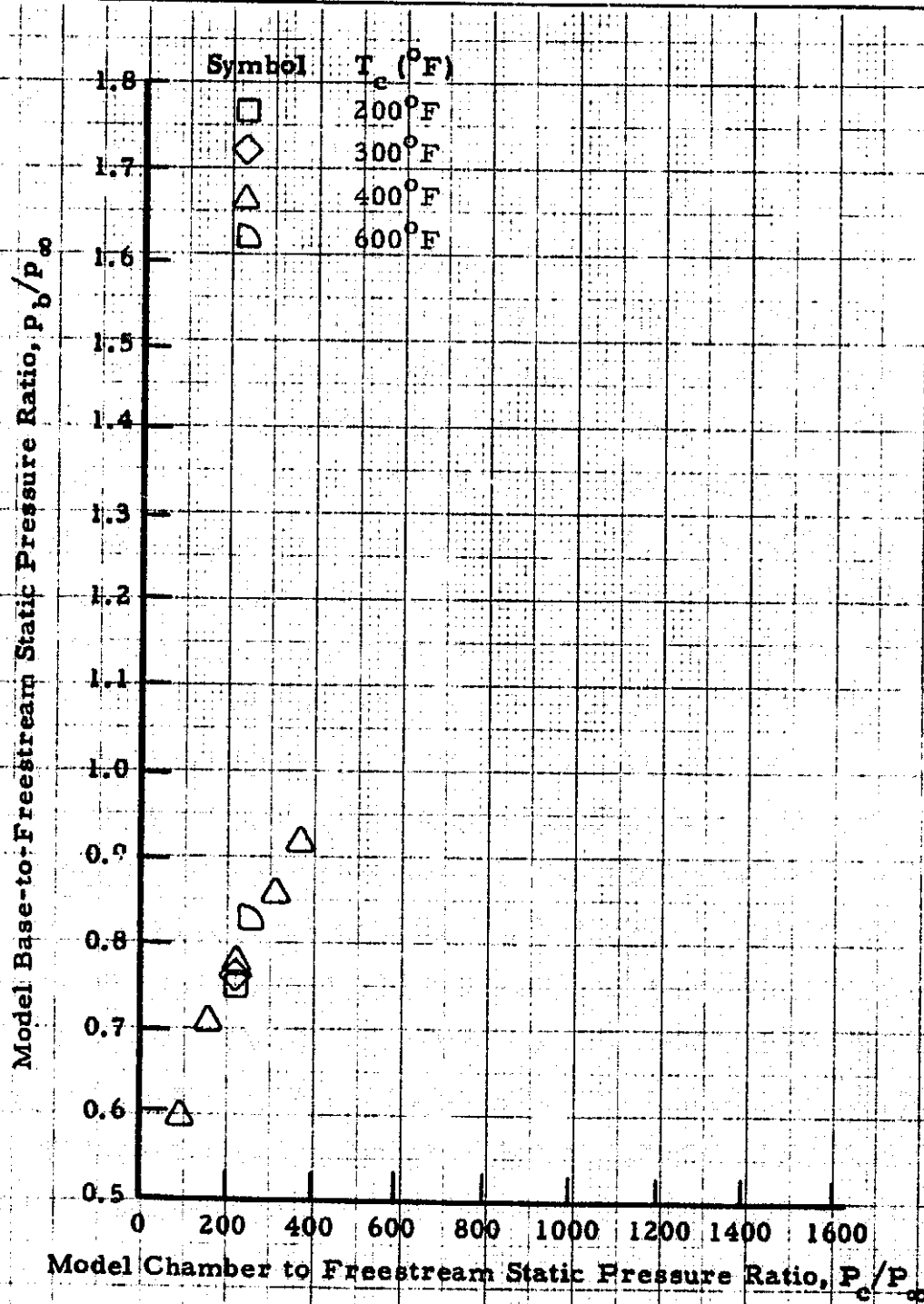


Fig. 87 - Model Base Pressure Variation

Nozzle Config. Single, $A/A^* = \underline{8.0}$, $\theta_{lip} = \underline{15}$ deg,
 Test Gas CF₄, $M_\infty = \underline{3.48}$, $p_\infty = \underline{1.2}$ psi
 Pressure Tap No. 39

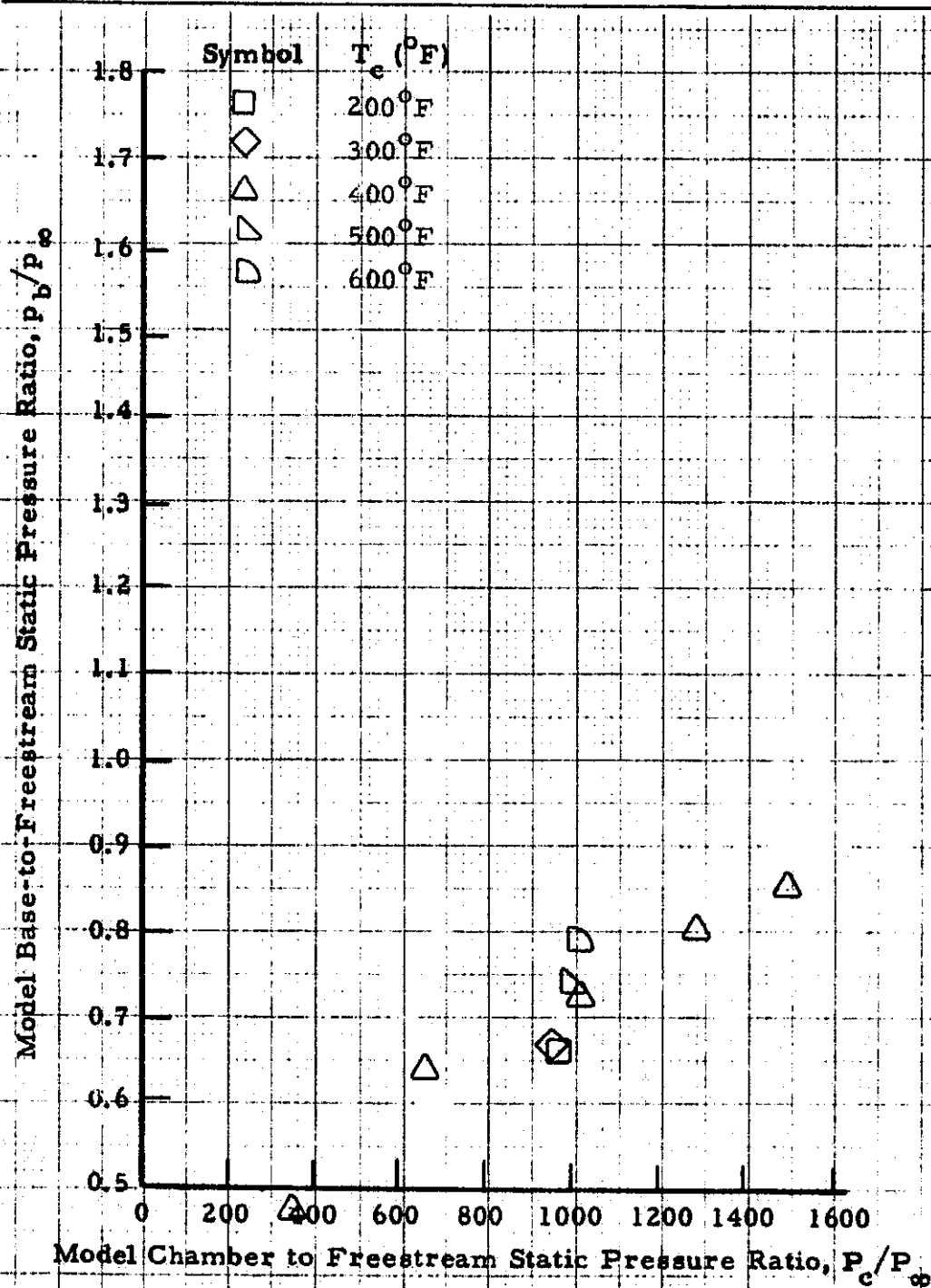


Fig. 88 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* = \underline{8.0}$, $\theta_{lip} = \underline{15}$ deg,
 Test Gas CF₄, $M_\infty = \underline{0.9}$, $p_\infty = \underline{10.7}$ psi
 Pressure Tap No. 39

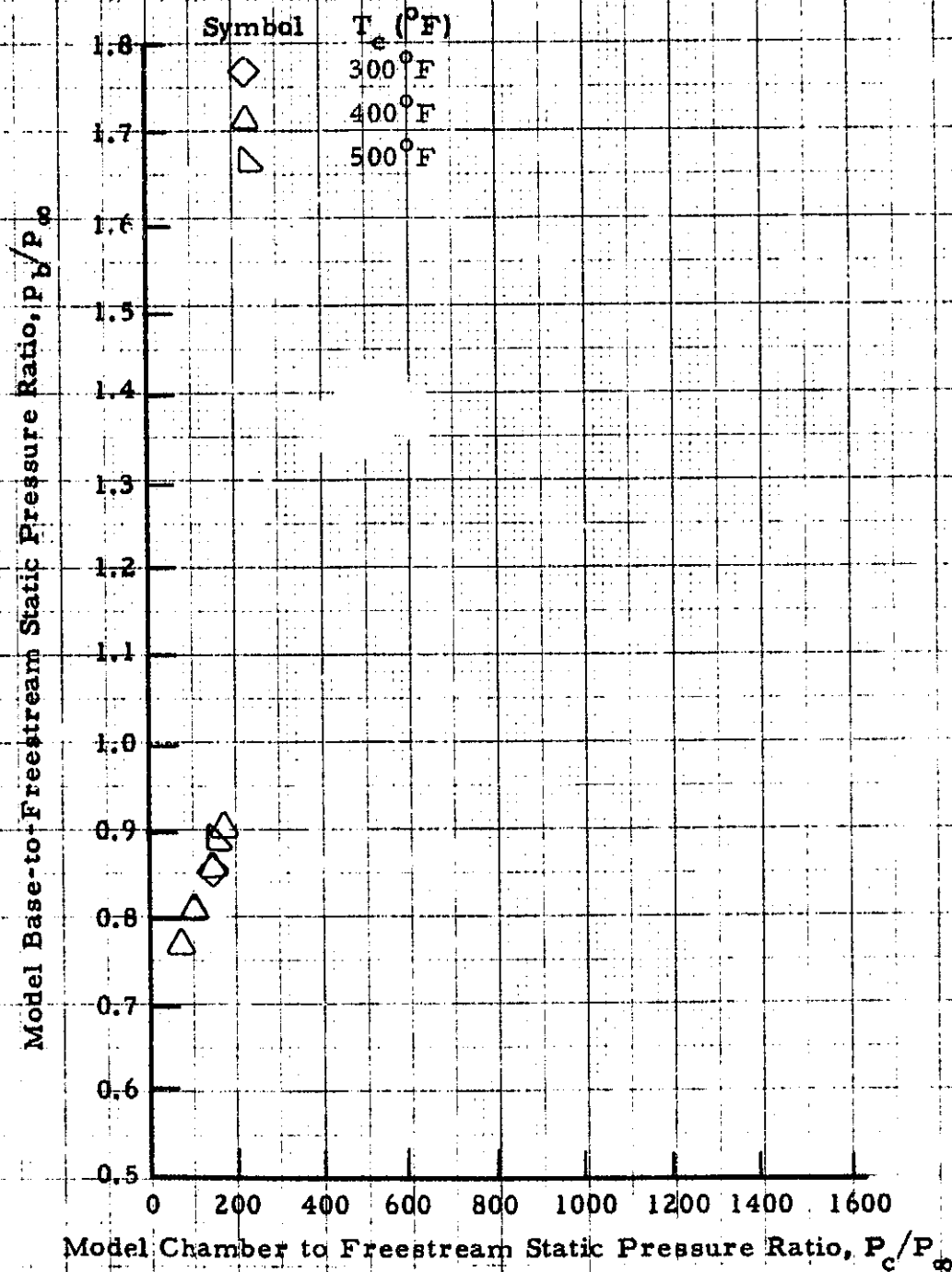


Fig. 89 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* = 8.0$, $\theta_{lip} = 15$ deg,
 Test Gas CF₄, $M_\infty = 1.2$, $p_\infty = 7.4$ psi
 Pressure Tap No. 39

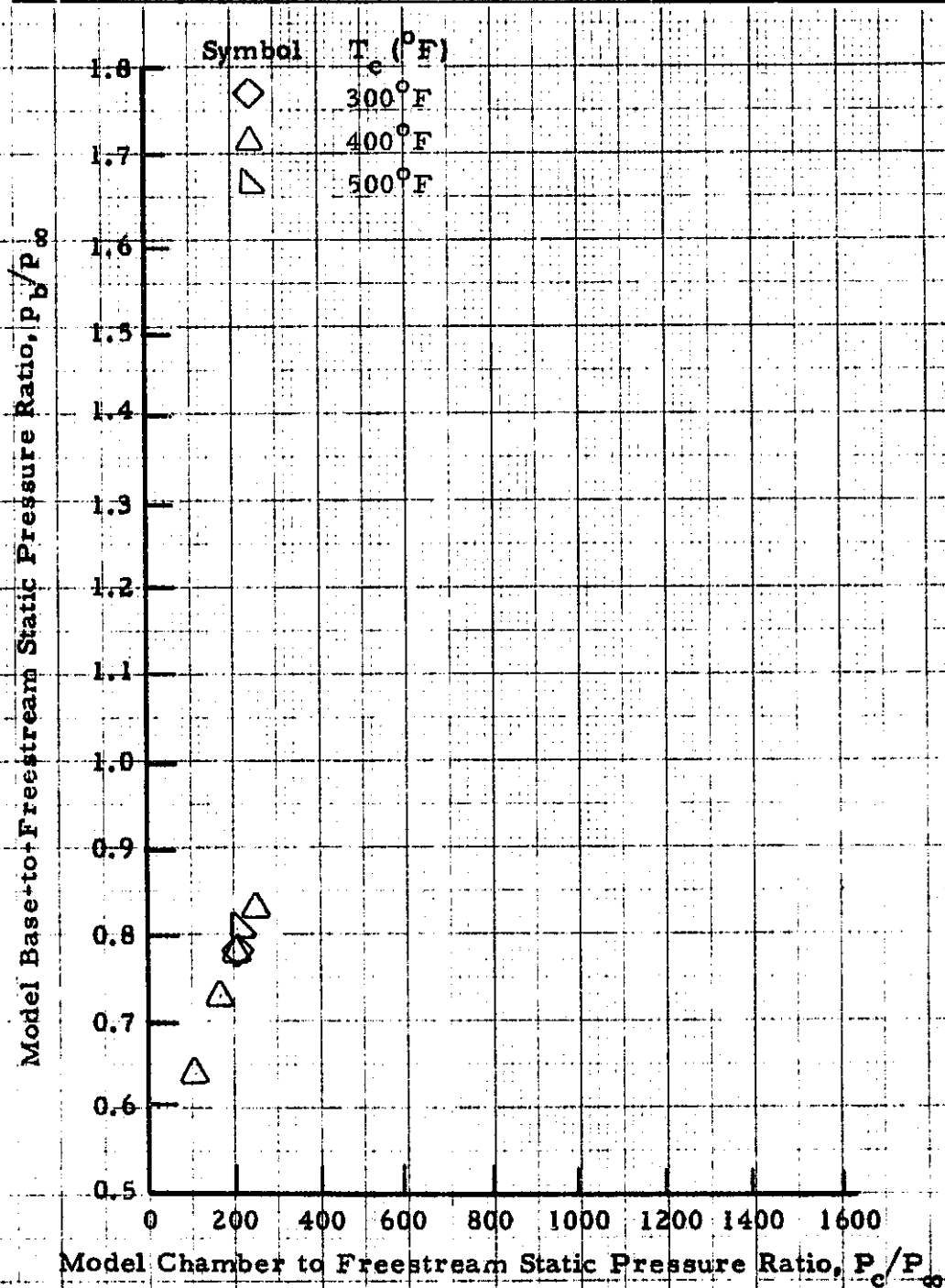


Fig. 90 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* =$ 8.0, $\theta_{lip} =$ 15 deg,
 Test Gas CF₄, $M_\infty =$ 1.46, $p_\infty =$ 5.1 psi
 Pressure Tap No. 39

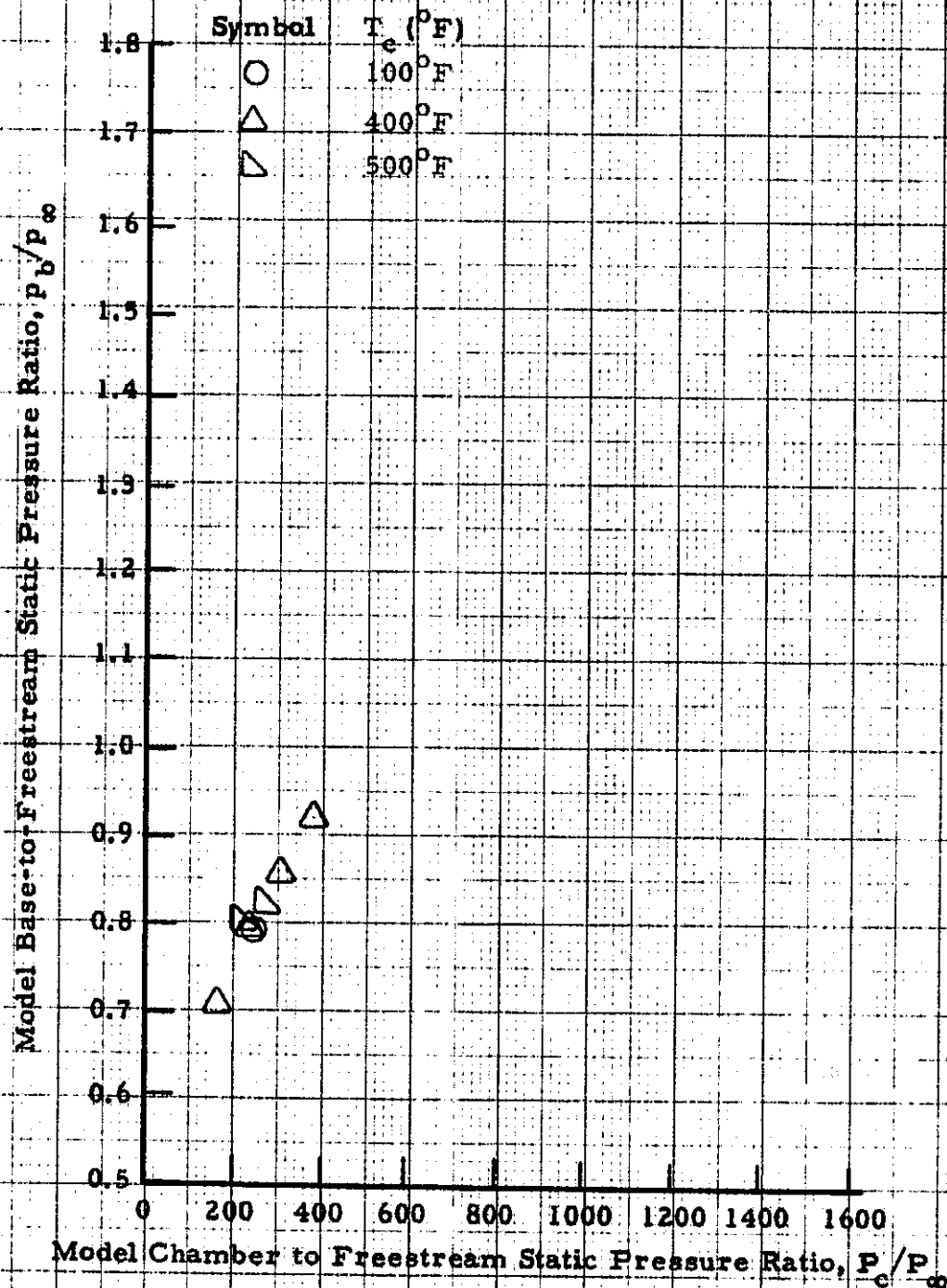


Fig. 91 - Model Base Pressure Variation

Nozzle Config. Triple, $A/A^* = \underline{8.0}$, $\theta_{lip} = \underline{15}$ deg,
 Test Gas CF₄, $M_\infty = \underline{3.48}$, $p_\infty = \underline{1.2}$ psi
 Pressure Tap No. 39

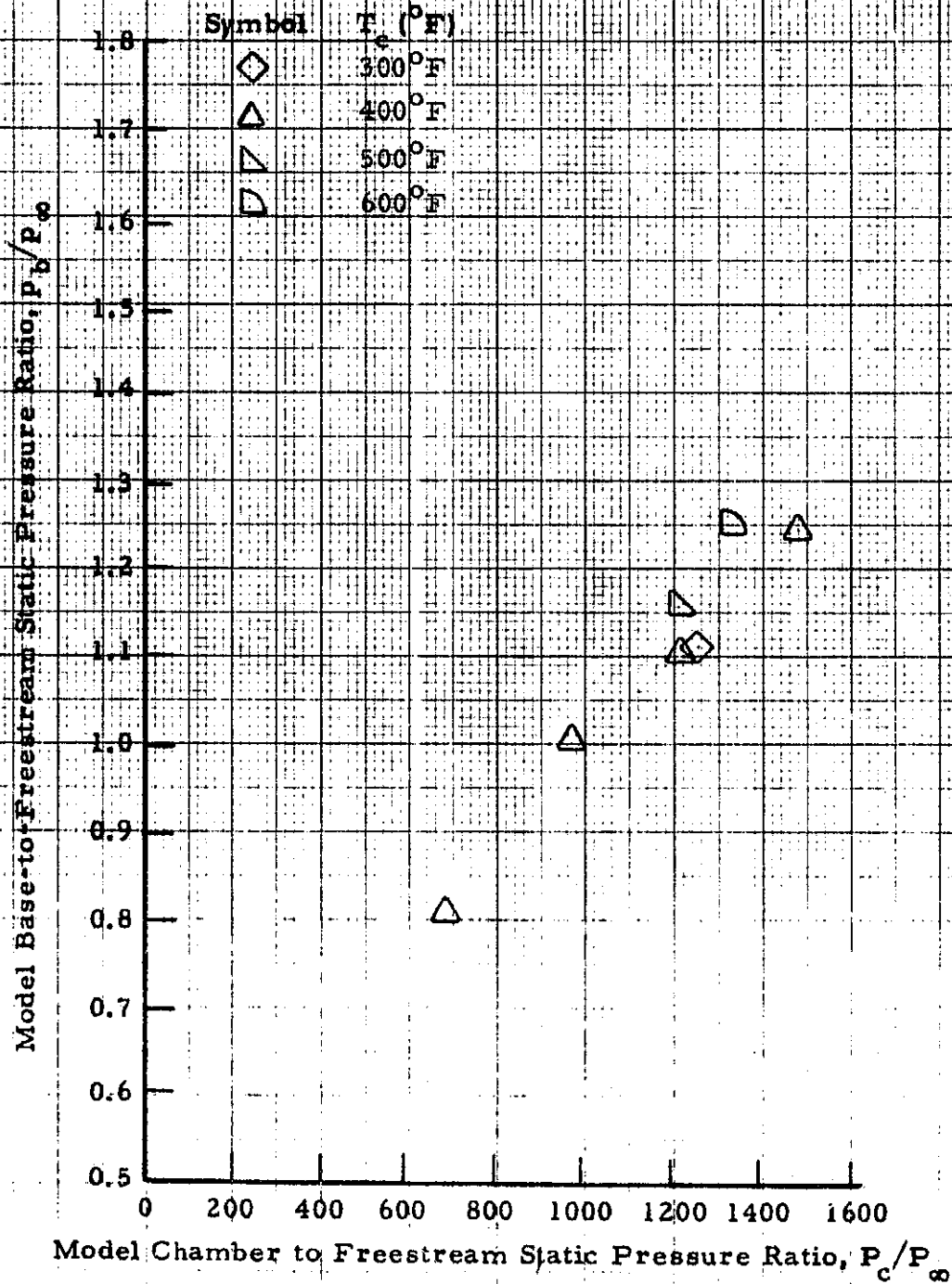


Fig. 92 - Model Base Pressure Variation

Appendix A

PLUME TECHNOLOGY TEST TABULAR PRESSURE DATA

NOMENCLATURE

ALPHA	model angle of attack, zero deg
AVERAGE MODEL NOZZLE PARAMETERS	time averaged value of model nozzle parameters
BETA	model angle of yaw, zero deg
FRAME	scanivalve port position
FR	frame
MACH	freestream Mach number
NO	static pressure port number
PS, PSA	freestream static pressure (psia)
PTC	model plenum chamber total pressure (psia)
PT	freestream total pressure (psia)
PSC	model plenum chamber static pressure (psia)
PSM/PSA	model surface or base pressure ratioed to free- stream static pressure
PSN()/PTC	nozzle static pressure ratioed to model plenum chamber pressure, tubes 44 through 49 for cali- bration phase only
P47/PTC	nozzle tap 47 static pressure ratioed to model plenum chamber total pressure
Q	freestream dynamic pressure (psia)
R/L	Reynolds number per foot $\times 10^{-6}$ (1/ft)
ROLL	model roll angle, zero deg
SKIN()	model skin temperature ($^{\circ}\text{F}$)
TEMP	freestream total temperature ($^{\circ}\text{F}$)
TC, TCH	model plenum chamber total temperature ($^{\circ}\text{F}$)

Appendix A

This appendix presents the two types of gaseous plume data obtained during the program, quiescent calibration points and nonquiescent test points.

Thermocouple number 5 was used during Runs 101 through 114. For all subsequent runs the data for SKIN(5) should be disregarded. The callouts "Heater Total Pressure" and "Heater Total Temperature" refer to the pressure and temperature set in the heater, not the values measured in the model which were different due to line losses from the heater to the model. Table 9 presents a summary of the calibration runs made for the various nozzle configurations, and detailed run log with any qualifying comments pertinent to each data point is presented in Table 11.

During the nonquiescent phase of the test the nozzle static pressure tubes were removed with the exception of those specified in the model description portion of this report. Model surface and base pressures were monitored as well as the model surface temperatures and chamber conditions.

A summary of the nonquiescent gaseous runs made for the various configurations is given in Table 10 and a detailed run log with any qualifying comments pertinent to each data point is presented in Table 11. The reader is cautioned to not use the aft surface pressure and base pressure data at Mach numbers of 0.9, 1.2 and 1.46 when schlieren photographs were being taken. This is due to the effects of the glass walls as opposed to the porous wall as discussed in Section 5. Runs during which schlieren photographs were made are denoted by the three-digit run number followed by a nonzero integer after the slash mark, e.g., run 164/0 was a pressure run at $M_{\infty} = 1.2$ but run 164/1 indicates that a schlieren photograph was being made thereby negating the surface and base pressure values for this data point. Also in using these

data one should be aware that the tabulated pressures are only valid for the frame during which they were recorded (frame refers to the Scanivalve port position (see Table 2)). In most cases the value printed in this appendix would be applicable to the whole run because the model exhaust total pressure and the freestream pressure were virtually constant during the time of data acquisition, e.g., run 161/0. However, for many of the high chamber pressure points in which the 3.5 area ratio nozzles were tested, there was insufficient capacity in the heater's hot tank to maintain a constant model chamber pressure, e.g., run 320/0. For these cases one should consider the measured base or surface pressure as being valid only for the frame in which it was recorded and use the model chamber pressure corresponding to that frame.

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 101/8

-----TEMPERATURE DATA---DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCM
1	1.06	114.88	76.1	77.0	77.8	77.4	75.6	71.7	73.4	78.7
2	1.07	119.93	75.6	76.5	77.0	77.4	75.2	71.7	73.9	79.2
3	1.10	115.93	76.1	75.6	76.1	77.0	74.3	71.2	73.9	79.6
4	1.10	116.46	76.1	75.6	76.5	77.8	74.3	71.2	75.6	79.6
5	1.12	116.46	75.6	75.6	76.5	77.0	74.8	71.7	76.1	88.5

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	113.30	114.35	80.8	0.01571	0.01084	0.01184	0.01112	0.01245	0.12686
2	114.35	114.35	80.9	0.01574	0.01015	0.01102	0.01102	0.01242	0.12558
3	114.35	115.48	80.9	0.01574	0.01023	0.01111	0.01120	0.01251	0.12558
4	115.93	115.93	82.2	0.01578	0.01009	0.01113	0.01104	0.01234	0.12388
5	114.88	115.48	81.8	0.01585	0.01027	0.01123	0.01183	0.01244	0.12581

TUNNEL STATIC PRESSURE= 1.089 HEATER TOTAL PRESSURE= 200. HEATER TOTAL TEMPERATURE= 580. ALPHA= 0.88

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 102/0

-----TEMPERATURE DATA---DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1	0.72	269.75	82.7	83.1	83.6	82.2	81.4	88.9	94.6	93.2
2	0.74	270.20	82.7	83.6	84.0	83.1	82.2	82.2	96.3	94.1
3	0.76	271.33	83.1	84.8	84.4	83.1	83.1	82.7	97.2	95.4
4	0.78	275.94	82.2	82.2	83.1	82.7	82.2	82.7	97.2	96.3
5	0.80	288.70	82.7	82.2	83.6	82.7	82.7	83.6	98.5	98.1

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	268.70	269.75	94.6	0.01755	0.01048	0.01122	0.01130	0.01294	0.05399
2	268.70	268.70	95.4	0.01755	0.01048	0.01122	0.01120	0.01290	0.05395
3	269.75	269.75	96.8	0.01752	0.01048	0.01122	0.01125	0.01288	0.05374
4	274.49	274.49	97.6	0.01740	0.01044	0.01117	0.01121	0.01284	0.05281
5	287.64	286.99	99.4	0.01754	0.01034	0.01114	0.01114	0.01281	0.05036

TUNNEL STATIC PRESSURE= 0.762 HEATER TOTAL PRESSURE= 300. HEATER TOTAL TEMPERATURE= 120. ALPHA= 0.80

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 103/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	0.53	467.64	85.8	85.3	85.3	84.9	84.4	84.8	96.3
2	0.56	466.59	85.8	84.4	85.3	84.9	84.4	84.4	97.6
3	0.58	478.88	85.3	84.4	85.3	84.9	85.3	85.8	99.8
4	0.62	472.38	85.3	84.4	85.3	84.9	85.3	86.2	101.6
5	0.64	474.49	85.3	85.8	85.8	85.3	87.1	88.8	104.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(49)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	467.12	468.17	98.5	0.01799	0.01828	0.01114	0.01119	0.01288	0.03105
2	465.84	468.81	99.8	0.01804	0.01826	0.01116	0.01127	0.01296	0.03114
3	469.22	469.75	101.2	0.01798	0.01822	0.01112	0.01118	0.01291	0.03087
4	472.18	471.33	103.4	0.01796	0.01822	0.01113	0.01117	0.01298	0.03071
5	473.43	473.96	105.6	0.01799	0.01826	0.01114	0.01123	0.01294	0.03062

TUNNEL STATIC PRESSURE= 0.987 HEATER TOTAL PRESSURE= 508. HEATER TOTAL TEMPERATURE= 128. ALPHA= 0.08

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 104/8

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-SYING FEEDER-PIPE	TCH	
1	0.44	928.70	88.0	88.0	87.5	87.1	89.3	91.5	107.8	110.0
2	0.47	928.17	88.4	87.1	87.1	88.0	90.2	93.2	110.4	111.3
3	0.50	936.86	88.8	87.5	87.5	88.0	90.6	95.0	113.5	113.5
4	0.53	938.70	88.8	88.0	87.5	88.0	93.2	97.2	115.7	116.1
5	0.55	942.91	88.4	87.5	87.5	88.4	94.6	99.8	117.0	117.0

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	927.12	925.54	111.7	0.01348	0.00974	0.01081	0.01088	0.01244	0.01566
2	927.64	921.85	112.6	0.01335	0.00976	0.01083	0.01093	0.01258	0.01563
3	935.01	934.49	115.2	0.01317	0.00973	0.01078	0.01089	0.01244	0.01551
4	936.59	931.85	117.4	0.01306	0.00976	0.01082	0.01092	0.01247	0.01550
5	941.33	933.96	117.9	0.01295	0.00973	0.01079	0.01089	0.01246	0.01541

TUNNEL STATIC PRESSURE= 0.500

HEATER TOTAL PRESSURE= 1000.

HEATER TOTAL TEMPERATURE= 125.

ALPHA= -0.02

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 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 105/0

-----TEMPERATURE DATA---DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCM
1	0.38	1379.75	90.2	89.7	90.2	90.6	91.9	96.8	111.3	113.0
2	0.42	1386.59	90.2	89.3	90.2	90.6	93.2	98.5	114.4	115.7
3	0.46	1358.17	90.6	90.2	90.6	91.0	95.8	108.7	116.1	116.1
4	0.91	1293.96	90.2	89.7	90.2	91.5	96.3	102.5	116.1	114.8
5	0.56	1246.59	89.7	90.6	90.2	91.9	98.5	104.2	115.2	114.4

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1379.22	1369.75	114.8	0.00348	0.00947	0.01054	0.01081	0.01218	0.01052
2	1388.17	1388.28	117.9	0.00345	0.00946	0.01049	0.01076	0.01208	0.01046
3	1358.17	1351.85	117.9	0.00384	0.00949	0.01051	0.01081	0.01212	0.01068
4	1295.01	1290.28	115.7	0.00478	0.00959	0.01068	0.01088	0.01222	0.01119
5	1247.12	1239.22	114.8	0.00568	0.00955	0.01058	0.01086	0.01218	0.01162

TUNNEL STATIC PRESSURE= 0.467 HEATER TOTAL PRESSURE= 1500. HEATER TOTAL TEMPERATURE= 125. ALPHA= -0.82

02 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

T-5T 575 RUN 10670

-----TEMPERATURE DATA---DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	0.34	1022.38	79.2	79.2	78.3	78.3	77.8	78.3	89.7	99.4
2	0.32	1001.33	78.7	78.7	77.8	77.8	78.3	88.9	97.2	104.7
3	0.35	1755.01	76.3	76.7	77.8	77.8	80.0	83.6	102.5	106.9
4	0.39	1650.28	78.7	77.8	77.8	78.3	81.4	86.2	103.8	105.6
5	0.45	1503.43	79.2	78.3	77.8	78.3	83.1	88.8	102.5	104.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1025.01	1013.96	101.2	0.01710	0.00950	0.01010	0.01042	0.01159	0.00794
2	1001.33	1792.91	106.0	0.01724	0.00955	0.01018	0.01047	0.01167	0.00884
3	1753.43	1747.12	108.2	0.01782	0.00934	0.01015	0.01048	0.01166	0.00826
4	1654.49	1649.75	106.9	0.01739	0.00964	0.01027	0.01059	0.01179	0.00876
5	1506.07	1581.85	105.6	0.01734	0.00959	0.01024	0.01055	0.01175	0.00914

TUNNEL STATIC PRESSURE= 0.369 HEATER TOTAL PRESSURE= 2000. HEATER TOTAL TEMPERATURE= 120. ALPHA= 0.80

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02 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 10770

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE		TCW
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
2	0.32	1740.28	164.5	201.9	205.0	208.5	258.2	462.0	447.0	446.1
3	0.32	1788.70	165.4	203.2	205.4	211.6	276.3	460.2	456.7	453.2
4	0.33	1818.70	165.8	204.6	206.3	214.2	293.9	459.3	467.2	458.6
5	0.35	1801.85	167.6	206.6	207.6	217.3	388.4	458.4	475.6	461.5

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1706.59	1705.01	443.5	0.01783	0.00985	0.01024	0.01062	0.01195	0.00843
2	1732.91	1782.38	445.7	0.01792	0.00991	0.01031	0.01066	0.01201	0.00835
3	1788.17	1779.75	452.7	0.01772	0.00988	0.01028	0.01055	0.01188	0.00810
4	1820.28	1811.85	458.4	0.01768	0.00979	0.01019	0.01055	0.01187	0.00795
5	1796.59	1786.87	462.0	0.01773	0.00982	0.01025	0.01058	0.01189	0.00807

TUNNEL STATIC PRESSURE= 0.330 HEATER TOTAL PRESSURE= 1988. HEATER TOTAL TEMPERATURE= 538. ALPHA= -0.02

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02 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 108/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-TYPE	TC	
1	0.49	208.17	232.3	259.6	253.4	249.0	270.1	496.3	434.5	441.7
2	0.51	210.28	232.3	260.4	254.3	249.4	275.4	494.1	449.6	441.3
3	0.53	211.33	232.3	259.6	253.4	249.4	278.9	498.1	441.7	439.1
4	0.55	211.33	232.7	260.0	253.4	249.9	284.6	487.5	437.3	437.3
5	0.58	213.96	233.2	262.2	254.3	251.6	290.4	485.7	432.9	435.6

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	287.12	205.54	441.3	0.01760	0.01875	0.01123	0.01147	0.01287	0.06984
2	289.22	206.59	440.8	0.01752	0.01869	0.01126	0.01148	0.01279	0.06924
3	289.22	207.64	439.1	0.01771	0.01883	0.01135	0.01155	0.01293	0.06924
4	210.28	208.17	436.9	0.01772	0.01882	0.01139	0.01154	0.01298	0.06889
5	213.96	211.33	435.6	0.01785	0.01873	0.01129	0.01143	0.01279	0.06775

TUNNEL STATIC PRESSURE= 0.933 HEATER TOTAL PRESSURE= 240. HEATER TOTAL TEMPERATURE= 886. ALPHA= -0.02

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03 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 109/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.53	402.91	227.4	256.9	260.0	264.4	283.3	495.0	510.3	464.2
2	0.55	406.59	227.9	257.4	259.6	264.4	289.5	494.1	505.1	465.9
3	0.57	413.96	228.8	258.7	260.4	265.3	297.8	493.2	495.0	467.2
4	0.59	414.49	228.3	258.2	260.8	265.3	304.4	492.3	487.9	469.0
5	0.62	416.59	229.2	259.6	260.9	267.0	311.5	491.0	483.5	468.1

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	402.38	397.64	463.7	0.01755	0.01088	0.01053	0.01063	0.01227	0.03680
2	409.54	401.33	466.4	0.01762	0.01032	0.01059	0.01067	0.01229	0.03574
3	411.33	407.64	467.2	0.01749	0.01025	0.01052	0.01064	0.01222	0.03522
4	412.91	409.22	468.1	0.01757	0.01031	0.01055	0.01072	0.01232	0.03586
5	415.50	411.33	468.1	0.01761	0.01031	0.01058	0.01067	0.01229	0.03484

409.5

TUNNEL STATIC PRESSURE= 0.570 HEATER TOTAL PRESSURE= 450. HEATER TOTAL TEMPERATURE= 660. ALPHA= 0.00

03 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 110/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]	MODEL-STING FEEDER-PIPE	TC-	
1	0.40	638.17	228.8	263.1	272.8	269.7	268.2	540.3	484.0	462.4
2	0.43	653.43	228.3	262.2	272.3	269.7	296.5	534.1	477.4	465.9
3	0.46	670.28	229.2	264.4	272.8	271.0	306.2	528.8	476.0	469.9
4	0.48	667.12	229.2	264.4	272.3	271.9	315.4	523.1	477.8	473.8
5	0.50	672.38	228.8	264.0	271.9	273.2	324.7	518.7	482.6	476.5

FRAME	PTC	PSC	TC	PSN[44]/PTC	PSN[45]/PTC	PSN[46]/PTC	PSN[47]/PTC	PSN[48]/PTC	PSN[49]/PTC
1	636.59	629.75	462.0	0.01020	0.01028	0.01001	0.01009	0.01240	0.02276
2	652.38	645.01	465.0	0.01002	0.01028	0.01049	0.01078	0.01229	0.02220
3	669.75	661.33	469.9	0.01779	0.01007	0.01037	0.01064	0.01212	0.02163
4	666.06	659.22	472.5	0.01000	0.01023	0.01053	0.01088	0.01232	0.02172
5	670.00	664.49	475.2	0.01005	0.01024	0.01053	0.01082	0.01234	0.02158

TUNNEL STATIC PRESSURE= 0.454 HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 600. ALPHA= 0.00

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03 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 111/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	0.52	801.85	176.0	217.3	229.2	258.7	314.1	586.0	512.1
2	0.55	804.49	177.3	219.5	229.6	260.9	325.6	578.6	515.6
3	0.57	813.96	177.3	220.8	230.5	262.2	336.6	570.6	521.4
4	0.60	816.59	178.6	222.2	231.0	264.8	346.2	564.8	526.2
5	0.62	816.06	179.0	225.2	232.3	267.5	357.2	558.8	532.8

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	797.64	798.28	498.5	0.01020	0.01021	0.01055	0.01085	0.01233	0.01815
2	803.43	797.12	502.9	0.01024	0.01024	0.01059	0.01089	0.01235	0.01803
3	812.91	805.54	506.8	0.01015	0.01019	0.01052	0.01082	0.01230	0.01781
4	818.70	812.38	509.8	0.01011	0.01017	0.01051	0.01082	0.01228	0.01768
5	816.99	808.17	513.4	0.01024	0.01024	0.01061	0.01087	0.01235	0.01774

TUNNEL STATIC PRESSURE= 0.572 HEATER TOTAL PRESSURE= 850. HEATER TOTAL TEMPERATURE= 688. ALPHA= 0.88

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03 AUGUST 1973

MSEC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 112/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	0.48	936.06	222.6	263.5	277.6	289.0	327.8	544.2	495.0
2	0.51	946.59	223.0	263.5	277.2	289.9	337.9	538.5	500.2
3	0.53	958.17	223.9	266.2	278.8	290.8	349.8	535.4	505.5
4	0.55	961.85	224.4	265.3	277.2	293.0	359.8	531.9	510.4
5	0.58	967.12	224.4	267.5	278.0	295.2	369.6	530.2	515.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	933.96	923.96	495.8	0.01823	0.01813	0.01854	0.01883	0.01228	0.01551
2	945.54	938.17	499.8	0.01823	0.01815	0.01854	0.01883	0.01228	0.01531
3	968.80	952.91	506.4	0.01887	0.01886	0.01847	0.01874	0.01218	0.01507
4	968.28	952.38	518.4	0.01817	0.01813	0.01852	0.01888	0.01225	0.01588
5	967.64	961.33	515.6	0.01813	0.01818	0.01851	0.01878	0.01222	0.01497

TUNNEL STATIC PRESSURE= 0.531 HEATER TOTAL PRESSURE= 1408. HEATER TOTAL TEMPERATURE= 615. ALPHA= 0.80

03 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 975 RUN 113/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.18	1379.22	189.2	233.2	242.4	280.7	370.9	515.2	557.9	532.8
2	1.13	1323.43	198.8	237.1	243.3	282.9	383.6	517.4	562.3	533.7
3	1.18	1271.85	191.4	240.2	244.6	286.4	395.1	519.6	561.8	533.7
4	1.22	1230.28	193.6	244.2	245.9	289.9	404.8	520.9	561.8	532.8
5	1.25	1197.12	194.4	246.8	246.4	292.6	413.1	521.8	561.4	532.8

FRAME	PTC	PSC	TC	PSN(441)/PTC	PSN(451)/PTC	PSN(461)/PTC	PSN(471)/PTC	PSN(481)/PTC	PSN(491)/PTC
1	1379.22	1367.64	533.7	0.01882	0.00994	0.01842	0.01868	0.01287	0.01851
2	1323.43	1312.91	534.1	0.01815	0.01803	0.01888	0.01877	0.01216	0.01895
3	1271.85	1265.54	533.7	0.01830	0.01812	0.01858	0.01886	0.01226	0.01839
4	1230.28	1217.64	533.7	0.01832	0.01814	0.01864	0.01889	0.01238	0.01879
5	1197.12	1187.64	533.2	0.01821	0.01809	0.01859	0.01884	0.01225	0.01811

TUNNEL STATIC PRESSURE= 1.175

HEATER TOTAL PRESSURE= 1050.

HEATER TOTAL TEMPERATURE= 625. ALPHA= 0.00

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03 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 114/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-87(NG FENDER-PIPE	TCM	
1	0.32	1778.70	248.1	268.8	278.9	284.2	321.6	586.0	596.2	548.2
2	0.33	1838.88	249.8	270.1	279.4	286.0	340.5	512.6	588.8	550.4
3	0.34	1888.70	249.4	272.3	288.2	288.6	359.9	518.3	576.4	550.0
4	0.37	1717.64	249.4	274.5	288.2	291.7	374.8	523.6	576.8	549.1
5	0.42	1662.38	249.9	275.0	288.7	295.6	392.9	526.6	573.7	546.0

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
0	-2.88	14.49	145.6	-4.27918	-4.93287	-5.02491	-4.99822	9.58257	-5.02144
2	1838.28	1819.22	558.8	8.81781	8.88983	8.81829	8.81056	8.81191	8.88791
3	1818.70	1814.28	590.6	8.81778	8.88977	8.81824	8.81549	8.81183	8.88797
4	1716.59	1789.82	548.2	8.81885	8.88997	8.81845	8.81871	8.81288	8.88843
5	1686.67	1646.87	546.8	8.81885	8.88997	8.81846	8.81872	8.81288	8.88873

TUNNEL STATIC PRESSURE= 0.356 HEATER TOTAL PRESSURE= 2000. HEATER TOTAL TEMPERATURE= 625. ALPHA= 0.00

08 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 11570

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.63	409.73	84.5	90.2	90.6	91.0	0.0	199.4	284.3
2	10.63	414.46	85.8	91.5	91.5	92.3	0.0	189.9	265.7

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	409.2	197.7	0.0109	9.06	5 0.09684	6 0.98418	11 0.96264	16 0.97392	23 0.96373	29 1.00302	34 0.86077	35 1.68189			
2	413.4	199.4	0.0108	9.07	4 0.95245	7 0.97537	12 0.96846	17 1.01102	24 0.96628	30 0.98810	41 0.78001	36 1.01612			
3	407.6	199.4	0.0109	9.07	3 0.88478	8 0.98847	13 0.97355	18 0.98665	25 0.96082	31 0.97865	42 0.78255	37 1.01503			
4	410.8	199.9	0.0109	9.06	2 1.07978	9 0.97828	14 0.97537	19 0.97937	26 0.97719	32 0.96373	39 0.77455	38 0.85822			
5	414.5	200.3	0.0109	9.06	1 1.14964	10 0.96846	15 0.98192	20 0.96628	27 0.98483	33 0.94190	40 0.77419	43 0.78073			
6	412.4	201.2	0.0109	9.06				21 0.93935	28 0.98447						

WIND TUNNEL TEST CONDITIONS..... Q 6.046 PT 18.011 PS 10.632 R/L 5.1 MACH 0.901 TEMP 101.6
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 411.3 TC= 199.6 PTC/PSA= 38.69 PSM(221)/PSA= 0.8525
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 425. HEATER TOTAL TEMPERATURE= 215.

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08 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 115/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.74	369.20	106.7	103.2	104.9	104.9	0.0	234.1	444.3
2	10.72	371.30	105.3	101.4	103.6	104.0	0.0	229.8	426.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	367.6	272.2	0.0107	9.14	5	0.99537	6	0.98420	11	0.96331	16	0.97231	23	0.96547	29	0.99861	34	0.86100	35	1.03932
2	367.6	271.8	0.0107	9.14	4	0.95034	7	0.97520	12	0.96835	17	1.00654	24	0.96619	30	0.98420	41	0.78859	36	1.01266
3	367.1	272.7	0.0107	9.14	3	0.88946	8	0.98672	13	0.97159	18	0.98060	25	0.96043	31	0.97484	42	0.79639	37	1.01158
4	366.6	272.7	0.0107	9.14	2	1.07462	9	0.97592	14	0.97556	19	0.97592	26	0.97484	32	0.95970	39	0.78354	38	0.85667
5	369.2	272.2	0.0107	9.13	1	1.14667	10	0.96691	15	0.97880	20	0.96331	27	0.96168	33	0.93701	40	0.78426	43	0.78678
6	369.2	272.2	0.0107	9.13									21	0.96331	28	0.98168				

WIND TUNNEL TEST CONDITIONS..... Q 5.979 PT 18.004 PS 10.737 R/L 5.1 MACH 0.892 TEMP 104.6
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 367.9 TC= 272.3 PTC/PSA= 34.26 PSM(22)/PSA= 0.8509
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 420. HEATER TOTAL TEMPERATURE= 220.

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 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 11670

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.55	740.78	96.2	94.9	97.1	98.0	0.0	212.4	341.6
2	10.48	764.99	97.1	95.8	97.1	98.4	0.0	205.9	300.9

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	740.3	244.5	0.0109	9.17	5	1.00199	6	0.98838	11	0.96448	16	0.97882	23	0.96779	29	1.00860	34	0.88175
2	742.9	243.6	0.0109	9.17	4	0.95566	7	0.97698	12	0.96963	17	1.01486	24	0.96595	30	0.99316	41	0.82586
3	752.9	242.8	0.0108	9.16	3	0.87917	8	0.98985	13	0.97404	18	0.99059	25	0.95896	31	0.98323	42	0.82917
4	752.9	241.0	0.0109	9.18	2	1.08509	9	0.97919	14	0.97735	19	0.98397	26	0.97956	32	0.97036	39	0.82071
5	761.3	241.0	0.0109	9.20	1	1.15826	10	0.96963	15	0.98581	20	0.97294	27	0.98838	33	0.95124	40	0.82365
6	768.1	238.9	0.0108	9.19									21	0.94793	28	0.98838		

WIND TUNNEL TEST CONDITIONS..... Q 6.112 PT 18.011 PS 10.519 R/L 5.1 MACH 0.911 TEMP 101.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 753.1 TC= 242.0 PTC/PSA= 71.59 PSN(221)/PSA= 0.8727
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 820. HEATER TOTAL TEMPERATURE= 220.

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 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 117/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.65	1121.83	100.6	98.0	99.7	98.0	0.0	230.2	290.9	230.2
2	10.64	1117.62	101.4	98.4	99.3	99.7	0.0	215.0	254.5	222.0

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1120.3	230.6	0.0107	9.70	5	0.99726	6	0.98491	11	0.96421	16	0.97801	23	0.96421	29	1.00779	34	0.92099	35	1.03975
2	1117.6	229.8	0.0107	9.69	4	0.95005	7	0.97293	12	0.96857	17	1.01288	24	0.96421	30	0.99363	41	0.89267	36	1.01832
3	1117.6	226.3	0.0107	9.67	3	0.88250	8	0.98527	13	0.97184	18	0.99000	25	0.95876	31	0.98491	42	0.89630	37	1.01869
4	1123.4	225.4	0.0106	9.69	2	1.07897	9	0.97692	14	0.97729	19	0.98636	26	0.97874	32	0.97583	39	0.88540	38	0.91664
5	1122.9	223.7	0.0107	9.69	1	1.14834	10	0.96784	15	0.98419	20	0.97692	27	0.98709	33	0.96240	40	0.88795	43	0.89339
6	1124.5	223.3	0.0107	9.70									21	0.95804	28	0.98709				

WIND TUNNEL TEST CONDITIONS..... Q 6.026 PT 17.998 PS 10.651 R/L 5.1 MACH 0.899 TEMP 101.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1121.0 TC= 226.5 PTC/PSA= 105.26 PSM(22)/PSA= 0.9098
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1240. HEATER TOTAL TEMPERATURE= 220.

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MSEC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 375 RUN 118/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.72	1480.78	109.7	102.7	104.9	103.2	0.0	198.6	229.8
2	10.71	1486.57	110.1	102.7	104.0	103.6	0.0	191.2	220.7

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	1480.3	229.8	0.0105	10.15	5	0.99712	6	0.98522	11	0.96646	16	0.98161	23	0.96393	29	1.00975	34	0.95672	35	1.65622
2	1485.5	227.6	0.0105	10.15	4	0.94950	7	0.97331	12	0.97007	17	1.01588	24	0.96610	30	0.99748	41	0.94121	36	1.02021
3	1475.0	225.4	0.0106	10.15	3	0.88926	8	0.98702	13	0.97548	18	0.99604	25	0.96357	31	0.99243	42	0.94842	37	1.02454
4	1483.9	223.3	0.0105	10.15	2	1.07685	9	0.97692	14	0.97836	19	0.99352	26	0.98017	32	0.98558	39	0.93399	38	0.95419
5	1486.6	221.5	0.0106	10.16	1	1.14611	10	0.96971	15	0.98666	20	0.98847	27	0.98955	33	0.97909	40	0.93796	43	0.94337
6	1499.2	220.2	0.0105	10.17									21	0.97620	28	0.99099				

WIND TUNNEL TEST CONDITIONS..... Q 5.988 PT 18.004 PS 10.722 R/L 5.1 MACH 0.893 TEMP 100.8
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1485.1 TC= 224.6 PTC/PSA= 138.51 PSM(22)/PSA= 0.9470
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1645. HEATER TOTAL TEMPERATURE= 220.

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MSEC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 120/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.45	1826.57	70.7	82.8	82.8	84.5	0.0	183.4	233.7
2	7.44	1853.94	72.0	84.1	84.1	88.0	0.0	179.0	216.8

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1832.9	208.5	0.0103	7.13	5	0.90326	6	1.00662	11	0.98377	16	1.01026	23	0.92455	29	1.03883	34	0.96715	35	1.14167
2	1836.0	206.8	0.0103	7.11	4	0.78587	7	0.99623	12	0.97234	17	1.05856	24	1.01597	30	1.01285	41	0.95312	36	0.99260
3	1842.9	206.8	0.0103	7.12	3	0.96299	8	1.00091	13	0.95156	18	1.02065	25	0.94221	31	0.98377	42	0.96299	37	1.03571
4	1813.9	206.8	0.0105	7.13	2	1.29074	9	0.97857	14	1.02220	19	1.01649	26	1.02220	32	0.99519	39	0.95208	38	0.94014
5	1856.0	205.5	0.0102	7.12	1	1.37177	10	0.97961	15	1.01337	20	0.99623	27	1.01701	33	0.99000	40	0.96559	43	0.96143
6	1834.5	205.5	0.0104	7.12									21	0.98065	28	1.02480				

WIND TUNNEL TEST CONDITIONS..... 0 7.482 PT 18.017 PS 7.447 R/L 5.4 WACH 1.198 TEMP 107.6
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1836.0 TC= 206.6 PTC/PSA= 246.55 PSM(22)/PSA= 0.9566
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2030. HEATER TOTAL TEMPERATURE= 220.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RJN 120/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.41	1707.62	109.7	103.2	107.1	107.1	0.0	196.0	231.1
2	7.40	1731.31	109.7	102.3	104.9	105.8	0.0	188.6	215.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	1699.7	206.4	0.0104	7.81	5	0.90359	6	0.97933	11	1.02215	16	1.09110	23	1.08170	29	1.09789	34	1.06081	35	1.15639
2	1701.3	205.5	0.0104	7.82	4	0.81010	7	1.07177	12	1.01066	17	1.12871	24	1.07491	30	1.08901	41	1.03939	36	1.10781
3	1701.3	204.2	0.0104	7.83	3	0.95321	8	1.12818	13	1.02424	18	1.11095	25	1.00544	31	1.09423	42	1.04931	37	1.12505
4	1709.2	205.1	0.0104	7.83	2	1.30472	9	1.10363	14	1.01589	19	1.11199	26	1.07700	32	1.09528	39	1.03312	38	1.04200
5	1723.4	204.2	0.0103	7.84	1	1.40971	10	1.06446	15	1.07386	20	1.10468	27	1.07961	33	1.09267	40	1.04931	43	1.04252
6	1723.4	204.2	0.0103	7.84									21	1.10468	28	1.07961				

WIND TUNNEL TEST CONDITIONS..... Q 7.483 PT 17.998 PS 7.406 R/L 5.4 MACH 1.202 TEMP 105.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1709.7 TC= 204.9 PTC/PSA= 230.87 PSM(22)/PSA= 1.0571
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2060. HEATER TOTAL TEMPERATURE= 220.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 122/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.38	1128.25	84.1	89.7	94.1	100.1	0.0	213.7	261.0
2	7.38	1141.83	84.1	91.0	94.5	101.0	0.0	202.0	236.3

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1129.7	217.6	0.0107	6.77	5	0.90111	6	1.01217	11	0.98598	16	1.01951	23	0.94459	29	1.04151	34	0.93516	35	1.13110
2	1129.2	217.2	0.0107	6.78	4	0.77537	7	1.00903	12	0.98598	17	1.06299	24	1.01898	30	1.02527	41	0.80942	36	0.99908
3	1115.5	215.0	0.0108	6.77	3	0.95769	8	0.99436	13	0.95874	18	1.03313	25	0.94773	31	0.99017	42	0.81624	37	1.03575
4	1125.5	214.6	0.0108	6.78	2	1.29665	9	0.99489	14	1.01322	19	1.02003	26	1.02841	32	0.99017	39	0.80576	38	0.92049
5	1121.3	213.3	0.0108	6.78	1	1.36843	10	0.98545	15	1.00955	20	1.01322	27	1.02318	33	0.99646	40	0.82252	43	0.81624
6	1139.7	212.4	0.0107	6.77									21	0.98703	28	1.01951				

WIND TUNNEL TEST CONDITIONS..... Q 7.506 PT 18.029 PS 7.383 R/L 5.4 MACH 1.205 TEMP 107.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1126.8 TC= 215.0 PTC/PSA= 152.62 PSM(22)/PSA= 0.9177
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1260. HEATER TOTAL TEMPERATURE= 210.

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USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 123/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.38	751.30	104.0	101.9	105.8	107.5	0.0	202.9	270.1
2	7.34	764.99	104.0	99.3	103.6	106.2	0.0	194.7	247.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	756.0	218.5	0.0109	6.71	5 0.90373	6 1.01060	11 0.98598	16 1.01898	23 0.94092	29 1.04308	34 0.92573	35 1.13529							
2	756.0	217.6	0.0110	6.71	4 0.77275	7 1.00379	12 0.98441	17 1.06142	24 1.01479	30 1.02422	41 0.71198	36 0.99803							
3	757.6	215.9	0.0110	6.72	3 0.95926	8 1.00222	13 0.95978	18 1.03208	25 0.94773	31 0.99122	42 0.72193	37 1.03942							
4	762.4	215.9	0.0110	6.72	2 1.29822	9 0.99646	14 1.01898	19 1.02265	26 1.03051	32 0.99646	39 0.71198	38 0.92154							
5	758.7	215.0	0.0110	6.72	1 1.36895	10 0.98860	15 1.01375	20 1.01322	27 1.02318	33 0.99593	40 0.72927	43 0.72193							
6	762.9	215.5	0.0110	6.71						21 0.98545	28 1.01951								

WIND TUNNEL TEST CONDITIONS..... Q 7.483 PT 17.986 PS 7.383 R/L 5.4 MACH 1.203 TEMP 107.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 758.9 TC= 216.4 PTC/PSA= 102.79 PSM(22)/PSA= 0.9098
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 840. HEATER TOTAL TEMPERATURE= 210.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 124/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.46	362.88	111.9	107.5	110.1	111.4	0.0	173.0	210.3
2	7.42	401.83	111.0	103.6	107.1	109.3	0.0	170.4	211.6

FR	PTC	TC	P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	360.8	210.7	0.0119	6.74	5 0.90313	6 1.00816	11 0.99672	16 1.01388	23 0.93121	29 1.04299	34 0.91873	35 1.14490			
2	370.8	212.4	0.0110	6.71	4 0.79394	7 0.99308	12 0.97332	17 1.05703	24 1.01804	30 1.01440	41 0.56725	36 0.99360			
3	379.7	212.0	0.0109	6.71	3 0.96240	8 1.00920	13 0.96292	18 1.02220	25 0.94732	31 0.98580	42 0.57973	37 1.03727			
4	386.6	212.4	0.0110	6.72	2 1.29360	9 0.98788	14 1.01960	19 1.02168	26 1.02479	32 0.99724	39 0.57141	38 0.91925			
5	396.0	212.0	0.0109	6.72	1 1.36327	10 0.98216	15 1.01284	20 1.00192	27 1.01804	33 0.98892	40 0.58753	43 0.58233			
6	400.8	212.9	0.0109	6.71					21 0.97904	28 1.02531					

WIND TUNNEL TEST CONDITIONS..... 0 7.471 PT 17.992 PS 7.439 R/L 5.4 MACH 1.198 TEMP 106.9
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 382.4 TC= 212.1 PTC/PSA= 51.41 PSH(22)/PSA= 0.9032
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 440. HEATER TOTAL TEMPERATURE= 210.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 124/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEED-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.33	444.46	110.6	102.7	104.9	105.3	0.0	209.8	341.2	233.7

FR	PTC	IC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA				
1	439.7	233.2	0.0110	21.74	5	0.90229	6	0.97985	11	1.02840	16	1.08538	23	1.07800	29	1.10279	34	0.99621	35	2.77651														
2	443.4	234.1	0.0109	7.21	4	0.81259	7	1.06850	12	1.01890	17	1.13656	24	1.08327	30	1.08908	41	0.68276	36	1.10754														
3	443.9	233.2	0.0109	7.21	3	0.95241	8	1.12232	13	1.02734	18	1.10491	25	1.01626	31	1.09013	42	0.69175	37	1.13551														
4	443.9	233.2	0.0109	7.19	2	1.30858	9	1.11704	14	1.00887	19	1.11018	26	1.06480	32	1.08327	39	0.67276	38	1.00254														
5	445.0	231.5	0.0109	7.18	1	1.41780	10	1.07536	15	1.04211	20	1.09646	27	1.07852	33	1.08011	40	0.68700	43	0.68595														
6	445.0	231.5	0.0109	7.18																														

WIND TUNNEL TEST CONDITIONS.....	0	7.507	PT	18.004	PS	7.331	R/L	5.4	MACH	1.210	TEMP	104.1
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	443.5	TC=	232.8	PTC/PSA=	60.50	PSM(22)/PSA=	1.3119				
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	480.	HEATER TOTAL TEMPERATURE=	220.								

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HSFC TRISONIC WIND TUNNEL - HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-LUMINESCENT PHASE

TEST 575 RUN 12570

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	5.13	539.15	101.9	98.8	100.6	99.7	0.0	284.4	331.2
2	5.12	509.67	101.4	98.0	99.7	99.3	0.0	278.3	321.7
3	5.15	488.62	101.4	97.5	99.3	98.8	0.0	272.7	312.6
4	5.14	459.15	101.4	97.5	98.8	98.8	0.0	267.5	305.2
5	5.17	445.99	101.9	97.5	98.8	99.7	0.0	263.6	297.8
6	5.15	435.46	101.4	95.4	98.4	99.3	0.0	257.9	290.0

FR	PTC	TC	P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	539.1	251.0	0.0111	4.93	5	0.87762	6	0.90469	11	0.98516	16	0.91071	23	0.96260	29	0.92274	34	0.97313	35	0.96486
2	509.7	250.6	0.0111	4.93	4	0.77083	7	0.95508	12	0.94756	17	0.91748	24	0.98817	30	0.97764	41	0.68660	36	1.14534
3	488.1	248.4	0.0110	4.91	3	1.01825	8	0.99268	13	0.95132	18	0.94530	25	0.93101	31	1.02502	42	0.68510	37	1.05886
4	458.1	247.1	0.0112	4.93	2	1.33034	9	0.98742	14	0.96486	19	0.98441	26	0.91372	32	1.01449	39	0.65276	38	1.04231
5	446.0	244.5	0.0111	4.93	1	1.43487	10	0.99193	15	0.95357	20	0.98290	27	0.94380	33	1.01374	40	0.66480	43	0.66134
6	435.5	242.8	0.0111	4.92																

WIND TUNNEL TEST CONDITIONS..... Q 7.747 PT 10.899 PS 5.143 R/L 5.3 MACH 1.467 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 479.6 TC= 247.6 PTC/PSA= 93.24 PSM(22)/PSA= 0.9576
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 475. HEATER TOTAL TEMPERATURE= 240.

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14 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 125/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]		
1	5.10	487.64	102.3	98.4	101.9	101.4	0.0	238.9	248.4
2	5.09	481.25	102.7	97.5	101.0	101.0	0.0	235.6	248.4
3	5.09	485.46	102.3	98.4	101.9	101.4	0.0	233.7	248.8
4	5.09	485.99	102.7	99.3	101.6	101.0	0.0	231.1	247.5
5	5.09	488.09	102.3	98.0	99.7	99.7	0.0	228.5	246.2
6	5.12	490.72	101.9	96.2	99.7	99.7	0.0	225.0	243.6

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	484.9	248.8	0.0110	5.31	5	0.91389	6	0.92452	11	0.93970	16	0.98068	23	0.95108	29	1.06342	34	1.05431	35	0.92679
2	481.3	249.7	0.0111	5.30	4	0.81066	7	0.94425	12	0.91617	17	0.97613	24	0.97917	30	1.09378	41	0.75221	36	1.19398
3	484.4	249.7	0.0110	5.32	3	1.04141	8	1.03458	13	0.97841	18	1.03458	25	0.97385	31	1.10820	42	0.76056	37	1.15223
4	485.5	248.0	0.0111	5.31	2	1.38905	9	1.00421	14	0.98676	19	1.06038	26	0.94880	32	1.10213	39	0.73551	38	1.18031
5	488.1	247.1	0.0111	5.32	1	1.44901	10	0.98676	15	0.98979	20	1.11959	27	0.95943	33	1.11655	40	0.75373	43	0.75145
6	491.3	244.1	0.0110	5.30																

WIND TUNNEL TEST CONDITIONS..... 0 7.746 PT 187815 PS - 9.096 R/L 5.3 MACH 1.471 TEMP- 101.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 485.9 TC= 247.9 PTC/PSA= 95.35 RSN1221/PSA= 1.0423
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 485. HEATER TOTAL TEMPERATURE= 225.

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FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.11	821.78	103.2	99.7	101.9	101.4	0.0	263.6	322.1	248.4
2	5.10	821.25	102.7	98.8	101.4	101.6	0.0	257.9	318.0	248.0
3	5.13	817.57	102.7	97.5	101.8	101.0	0.0	252.7	290.0	245.8
4	5.13	819.67	102.7	98.0	100.6	100.6	0.0	248.0	269.2	244.5
5	5.13	825.99	103.2	98.8	100.1	101.4	0.0	244.1	261.0	242.3
6	5.13	826.51	102.3	97.5	100.6	100.1	0.0	239.7	274.5	241.0

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WIND TUNNEL TEST CONDITIONS.....		Q	7.745	PT	18.009	PS	5.123	M/L	5.3	MACH	1.470	TEMP	101.1
MODEL ATTITUDE.....		ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..		PTC=	821.7	TC=	246.0	PTC/PSA=	160.38	PSM(221)/PSA= 0.9616					
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE= 900.					HEATER TOTAL TEMPERATURE= 238.						

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	5.05	1164.15	94.8	94.5	94.5	95.4	0.0	258.8	289.6	229.3
2	5.05	1173.88	98.0	92.5	94.1	95.4	0.0	251.0	274.0	226.7
3	5.05	1159.67	98.8	94.5	94.9	96.2	0.0	245.4	264.9	225.4
4	5.02	1176.51	98.8	94.1	94.5	96.2	0.0	239.3	255.8	223.3
5	5.03	1166.51	98.4	92.8	94.1	96.7	0.0	232.8	247.5	220.2
6	5.05	1176.51	98.8	94.5	94.5	98.0	0.0	227.2	241.0	219.4

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1169.7	230.6	0.0108	4.86	5 0.88725	6 0.87727	11 0.97091	16 0.94328	23 0.94328	29 0.94405	34 0.96938	35 0.98012			
2	1174.9	227.6	0.0107	4.85	4 0.78440	7 0.96017	12 0.96170	17 0.93100	24 0.97552	30 0.97091	41 0.87727	36 1.15435			
3	1159.1	226.3	0.0109	4.86	3 0.97014	8 0.98780	13 0.93791	18 0.95172	25 0.93868	31 1.00008	42 0.89262	37 1.06225			
4	1176.5	224.1	0.0107	4.85	2 1.30939	9 1.01082	14 0.93868	19 0.94865	26 0.92640	32 1.04229	39 0.86730	38 1.04152			
5	1166.5	220.7	0.0109	4.85	1 1.39305	10 0.99777	15 0.98856	20 0.97475	27 0.93407	33 1.01313	40 0.89569	43 0.87497			
6	1174.4	220.7	0.0108	4.85									21 0.99317	28 0.93561	

WIND TUNNEL TEST CONDITIONS..... Q 7.738 PT 18.009 PS 5.040 R/L 5.3 MACH 1.481 TEMP 202.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1170.2 TC= 225.0 PTC/PSA= 232.20 PSM(22)/PSA= 0.9626
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1320. HEATER TOTAL TEMPERATURE= 225.

SEC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.05	1587.34	105.0	102.3	106.2	106.7	0.0	240.6	304.3	247.1
2	5.03	1571.25	108.0	101.9	105.3	106.7	0.0	235.8	285.7	241.0
3	5.05	1581.25	108.0	101.4	105.3	106.2	0.0	232.8	273.1	237.6
4	5.05	1579.15	107.5	102.3	105.3	106.2	0.0	228.0	261.4	233.2
5	5.02	1577.04	108.4	101.9	104.0	105.3	0.0	224.1	252.3	229.8
6	5.02	1591.78	107.1	100.6	103.2	105.8	0.0	219.8	245.4	226.7

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WIND TUNNEL TEST CONDITIONS..... Q 7.740 PT 18.013 PS 5.038 R/L 5.3 MACH 1.482 TEMP 101.8
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1580.5 TC= 236.3 PTC/PSA= 315.69 PSM(221)/PSA= 0.9745
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1660. HEATER TOTAL TEMPERATURE= 225.

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TEST 575 RUV 129/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	4.96	1826.51	97.5	93.6	95.4	94.1	0.0	215.9	360.7	263.6
2	4.97	1813.88	98.4	94.5	97.1	94.9	0.0	216.8	334.7	259.7
3	4.99	1830.20	98.0	92.8	94.5	94.9	0.0	215.0	313.9	254.0
4	5.01	1819.15	97.5	92.8	94.5	94.9	0.0	214.2	297.0	249.7
5	4.98	1821.25	97.5	93.6	94.5	95.4	0.0	213.3	284.4	246.7
6	4.99	1833.88	97.5	93.6	94.5	96.2	0.0	212.0	274.0	243.6

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WIND TUNNEL TEST CONDITIONS..... Q 7.734 PT 18.011 PS 4.990 R/L 5.3 MACH 1.488 TEMP 102.5									
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1824.0 TC= 253.8 PTC/PSA= 365.55 PSN(22)/PSA= 0.9871									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2030, HEATER TOTAL TEMPERATURE= 250.									

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TEST 575 12971

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WIND TUNNEL TEST CONDITIONS.....	Q	7.739	PT	18.013	PS	5.028	RA	5.3	MACH	1.482
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0				
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC	1833.5	TC	227.0	PTC/PSA	364.64	PSM1221/PSA	1.6233		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE				HEATER TOTAL TEMPERATURE					
	2030.				825.					

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 13070

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1867.86	98.4	95.4	95.0	96.4	0.0	309.5	372.0	283.1
2	1.21	1854.95	98.4	92.8	95.8	97.1	0.0	305.6	344.6	276.6
3	1.21	1845.48	98.4	92.8	95.4	97.1	0.0	301.3	323.3	271.8
4	1.21	1848.54	98.0	93.2	95.8	96.7	0.0	297.4	307.4	268.3
5	1.21	1841.27	98.0	91.9	94.5	96.7	0.0	291.8	294.4	262.7

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1873.4	283.1	0.0103	1.21	5	0.84146	6	0.88286	11	0.95484	16	0.98287	23	0.95484	29	0.94019	34	0.94338	35	0.73890
2	1853.4	277.0	0.0104	1.21	4	0.78731	7	0.90006	12	1.00262	17	0.98223	24	0.98542	30	0.95420	41	0.98414	36	0.92236
3	1846.0	272.2	0.0104	1.21	3	1.47144	8	0.93255	13	1.00644	18	1.00453	25	0.99625	31	0.95420	42	1.03574	37	0.96312
4	1850.7	268.3	0.0104	1.21	2	2.255387	9	0.99688	14	0.97331	19	1.02682	26	0.98988	32	0.94783	39	0.98788	33	0.99561
5	1845.0	263.1	0.0104	1.21	1	2.68681	10	0.98351	15	1.01217	20	1.00707	27	1.00707	33	0.94911	40	1.06504	43	0.99561
6	1870.7	260.5	0.0103	1.21								21	1.00198	28	0.98733					

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.033 PS 1.214 R/L 10.5 MACH 3.480 TEMP 185.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.00
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1856.5 TC= 270.7 PTC/PSA= 1528.68 PSM(22)/PSA= 0.9939
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2050. HEATER TOTAL TEMPERATURE= 260.

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15 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 131/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TOM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.22	1490.22	97.5	96.2	98.0	86.7	0.0	334.7	359.4	277.9
2	1.22	1488.64	97.1	94.1	96.7	86.3	0.0	326.9	334.2	270.5
3	1.22	1492.85	98.0	95.4	96.7	86.7	0.0	321.7	315.2	265.7
4	1.22	1482.85	97.5	94.5	96.2	86.7	0.0	315.6	299.6	261.0
5	1.22	1493.38	97.1	93.2	95.4	87.1	0.0	308.7	286.1	254.5
6	1.21	1496.53	97.1	94.1	95.8	88.0	0.0	303.5	277.0	251.0

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1487.1	277.9	0.0107	1.21	5 0.88225	6 0.88360	11 0.95358	16 0.98284	23 0.95549	29 0.94022	34 0.94276	35 0.74302			
2	1488.1	271.4	0.0107	1.21	4 0.78945	7 0.90269	12 1.00193	17 0.98284	24 0.98729	36 0.95612	41 0.98269	36 0.92622			
3	1492.3	266.6	0.0106	1.21	3 1.87394	8 0.95977	13 1.00702	18 1.00574	25 0.99875	31 0.95780	42 0.94913	37 0.96821			
4	1489.2	261.4	0.0107	1.21	2 2.56493	9 1.00865	14 0.97203	19 1.02801	26 0.99238	32 0.95103	39 0.90714	38 1.00065			
5	1490.7	254.5	0.0107	1.21	1 2.67371	10 0.98475	15 1.01020	20 1.00765	27 1.00892	33 0.95167	40 0.97266	43 0.91541			
6	1495.0	251.9	0.0107	1.21											

WIND TUNNEL TEST CONDITIONS..... Q 10.305 PT 90.192 PS 1.216 2/L 10.1 MACH 3.480 TEMP 131.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.00
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC=1488.7 TC=263.9 PTC/PSA=1220.22 PSM/PSA=0.9943
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE=1670, HEATER TOTAL TEMPERATURE=2361

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.22	1148.62	81.9	78.9	81.5	82.4	0.0	222.0	321.2	244.9
2	1.22	1148.62	81.5	78.9	82.4	82.4	0.0	221.1	306.1	243.6
3	1.22	1147.97	82.1	79.8	81.9	81.9	0.0	221.5	292.6	243.2
4	1.22	1156.51	82.4	79.8	81.9	81.9	0.0	222.4	284.0	242.8
5	1.21	1145.46	82.4	78.0	80.6	82.4	0.0	221.1	274.8	239.3
6	1.21	1150.20	82.4	79.3	81.5	81.9	0.0	221.1	268.3	239.7

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
133149.7	244.9	0.0108	1.21	5 0.8855	6 0.8855	11 0.9622	16 0.9855	23 0.9583	29 0.9450	34 0.9424	35 0.7413				
233244.2	243.6	0.0107	1.21	4 0.9846	7 0.9042	12 1.0293	17 0.9736	24 0.9882	30 0.9956	41 0.8228	36 0.9278				
333148.7	246.1	0.0108	1.21	3 0.9857	9 0.9847	13 1.0112	18 1.0157	25 1.0020	31 0.9583	42 0.8610	37 0.9698				
433156.5	243.2	0.0107	1.21	2 2.5351	9 1.0012	14 0.9762	19 1.0296	26 0.9933	32 0.9522	39 0.8222	38 0.9984				
533144.4	240.2	0.0109	1.21	1 2.7116	10 0.9826	15 1.0175	20 1.0124	27 1.0157	33 0.9533	40 0.8487	43 0.8294				
63355.4	240.6	0.0108	1.21					28 0.9857	20 0.9902						

WIND TUNNEL TEST CONDITIONS.....0 10382 PM 70119 PS 1.250 R/L 49.55 INCH 2.480 TEMP 65.3
MODEL ATTITUDE.....ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL NOISE PARAMETERS.....PTC= 242.5 TC= 242.0 PTC/PSA= 945.31 RNM/223/PSA= 0.9970
HEATER PARAMETERS.....HEATER TOTAL PRESSURE= 1800, HEATER TOT. TEMPERATURE= 350

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TEST 575 RUN 133/0

FRANE	PSA	PTC	TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING	FEEBER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	779.69	108.4	103.2	108.0	109.3	0.0	319.9	376.7	283.1
2	1.21	775.48	108.4	102.7	107.1	108.4	0.0	316.9	361.1	281.4
3	1.21	778.11	108.0	103.2	106.7	107.5	0.0	313.4	345.9	279.2
4	1.21	777.59	108.0	103.2	106.2	107.5	0.0	310.4	332.9	276.1
5	1.21	782.32	108.4	101.9	105.8	107.1	0.0	307.4	322.5	273.5
6	1.21	779.16	107.5	100.1	104.0	106.2	0.0	303.0	311.3	269.2

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WIND TUNNEL TEST CONDITIONS: 10-282 PT 20,040 PS 1.245 R/L 10.4 MACH 3.480 TEMP 111.4
MODEL ATTITUDE: ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL NOISE PARAMETERS: MPO 277.2 TS 277.1 PTC/PSA 63993 PSM/221/PSA 0.9930
HEATER PARAMETERS: HEATER TOTAL PRESSURE 275 HEATER TOTAL TEMPERATURE 235

TEST 575 RUN 13470

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WIND TUNNEL TEST CONDITIONS..... Q 10.293 PT 28040 PS 1.225 R/L 10.5 MACH 3.480 TAMP 105.6
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
EXTRUDE MODEL/NOZZLE PARAMETERS... PTC= 380.4 TC= 244.4 PTCPSA= 313.16 PSM22TPSA= 0.9944
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 785 HEATER TOTAL TEMPERATURE= 265

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25 FEBRUARY 1974

MFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-OUTERSCENT PHASE

TEST 575 RUN 145/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	377.09	88.9	96.7	88.9	90.2	9.9	230.2	419.6	274.0

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	372.9	275.1	0.0100	6.66	5 0.89902	6 1.00077	11 0.98042	10 1.06703	23 0.92668	29 1.03364	34 0.91103	35 1.12600			
2	376.6	275.3	0.0107	6.68	4 0.70997	7 0.99034	12 0.97312	17 1.05147	24 1.01121	30 1.00808	41 0.56196	36 0.98773			
3	375.5	278.3	0.0107	6.68	3 0.95642	8 1.00234	13 0.95277	18 1.01695	25 0.94077	31 0.97886	42 0.56978	37 1.02999			
4	376.6	278.7	0.0107	6.67	2 1.20931	9 0.98460	14 1.01486	19 1.01121	26 1.01799	32 0.98825	39 0.55778	38 0.91103			
5	377.1	279.2	0.0107	6.68	1 1.36602	10 0.97938	15 1.01068	20 0.99451	27 1.01538	33 0.98564	40 0.57259	43 0.56717			
6	379.2	281.4	0.0107	6.70											

WIND TUNNEL TEST CONDITIONS..... 0 7.405 PT 10,004 PS 7.413 R/L 5.5 MACH 1.201 TEMP 100.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 376.3 IC= 277.7 PTC/PSA= 50.76 PSM(22)/PSA= 0.9008
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 430. HEATER TOTAL TEMPERATURE= 325.

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HSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST.,,NON-QUIESCIENT PHASE

TEST 575 RUN 146/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	7.44	796.57	86.7	88.4	91.0	94.1	0.0	273.1	380.6	296.1
2	7.42	806.04	86.7	88.0	90.2	95.8	0.0	261.0	352.0	297.8

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA			
1	795.0	295.7	0.0108	22.23	5	0.89877	6	1.08239	11	0.98209	16	1.00708	23	0.92481	29	1.03416	34	0.91283	35	2.76557
2	789.2	296.1	0.0109	6.70	6	0.78109	7	0.99094	12	0.97167	17	1.05395	24	1.00760	30	1.00864	41	0.71391	36	0.98781
3	801.8	296.1	0.0108	6.70	3	0.95501	8	1.00083	13	0.95136	18	1.01385	25	0.93887	31	0.97740	42	0.72485	37	1.02845
4	799.7	296.1	0.0108	6.69	2	1.28723	9	0.98104	14	1.01906	19	1.01385	26	1.02010	32	0.99042	39	0.71235	38	0.91179
5	800.8	297.2	0.0108	6.69	1	1.36326	10	0.97584	15	1.00604	20	0.99510	27	1.01177	33	0.98209	40	0.72049	43	0.72120
6	808.7	297.2	0.0107	6.68								21	0.97219	28	1.01906					

WIND TUNNEL TEST CONDITIONS..... Q 7,400 PT 18,004 PS 7,428 R/L 5.5 MACH 1.200 TEMP 99.7									
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS..... PTC= 799.2 TC= 296.5 PTC/PSA= 107.59 PSN(22)/PSA= 1.2495									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 830. HEATER TOTAL TEMP-RATURE= 325.									

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.37	1092.88	89.7	90.6	94.5	97.5	0.0	278.1	358.1	298.5
2	7.38	1118.15	90.2	89.7	94.1	99.3	0.0	259.2	337.7	298.7

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HIND TUNNEL TEST CONDITIONS.....		U	7.495	PT	17.998	PS	7.364	R/L	5.5	MACH	1.206	TFMP	99.7
MODEL ATTITUDE.....		ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..		PTC=	1111.0	TC=	298.5	PTC/PSA=	156.87	PSM(22)/PSA=		0.9116			
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE=					1235.	HEATER		TOTAL TEMPERATURE= 330.			

TEST 5 - RUN 148/0

4. TUNNEL TEST CONDITIONS.....	Q	7.479	PT	17.995	PS	7.421	R/L	5.5	MACH	1.200	TFWD	99.1
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
4. GRAZE ANGLE/NOZZLE PARAMETERS..	PTC=	1444.6	TC=	304.5	PTC/PSA=	194.67	PSM1221/PSA= 0.0212					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1645.					HEATER TOTAL TEMPERATURE= 335.						

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08 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST, NON-QUIESCENT PHASE

TEST 575 RUN 14970

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.49	1813.94	114.9	107.5	111.4	108.8	0.0	270.5	311.3
2	7.46	1808.67	114.5	104.9	108.8	110.6	0.0	261.8	310.4

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1823.0	311.3	1.0102	7.36	5	0.89950	6	1.00100	11	0.98236	16	1.00514	23	0.91711	29	1.02896	34	0.95160	35	1.12425
2	1819.0	310.0	0.0103	7.07	4	0.78557	7	0.98702	12	0.96579	17	1.04450	24	1.00100	30	1.00048	41	0.93420	36	0.98702
3	1820.0	310.5	0.0103	7.06	3	0.95430	8	0.99686	13	0.94118	18	1.00980	25	0.93627	31	0.97407	42	0.94352	37	1.02482
4	1826.0	310.4	0.0103	7.07	2	1.26167	9	0.97562	14	1.01012	19	1.00928	26	1.01653	32	0.98546	39	0.93316	38	0.93057
5	1818.0	310.4	0.0104	7.06	1	1.37250	10	0.98029	15	1.00677	20	0.96495	27	1.00980	33	0.97770	40	0.94559	43	0.93938
6	1833.0	310.4	0.0103	7.06																

WIND TUNNEL TEST CONDITIONS..... Q 7.469 PT 18.04 PS 7.469 R/L 5.5 MACH 1.195 TEMP 99.5
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 POLL 0.0
 AVERAGE NOZZLE PARAMETERS... PTC= 1825.5 TC= 310.3 PTC/PSA= 244.40 PSM(22)/PSA= 0.9458
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2005. HEATER TOTAL TEMPERATURE= 340.

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08 AUGUST 1-73

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 15070

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.61	1716.94	98.0	96.7	97.1	97.1	0.0	251.9	346.8	303.0
2	10.62	1744.99	95.8	97.1	98.0	99.7	0.0	244.9	325.6	303.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1727.1	302.6	1.124	10.20	5 0.99716	6 0.98405	11 0.96402	16 0.98442	23 0.96430	29 1.01501	34 0.97968	35 1.03905			
2	1742.4	304.5	1.0104	10.29	4 0.95267	7 0.97422	12 0.97094	17 1.01683	24 0.96694	30 1.00336	41 0.96940	36 1.02521			
3	1759.2	302.6	1.0104	10.30	3 0.98426	8 0.98806	13 0.97531	18 1.00190	25 0.96220	31 1.00008	42 0.97713	37 1.03213			
4	1740.6	302.2	0.0103	10.30	2 1.08166	9 0.97713	14 0.97932	19 1.00044	26 0.98332	32 0.99498	39 0.96220	38 0.97750			
5	1733.3	303.5	0.0104	10.32	1 1.14721	10 0.96803	15 0.98988	20 0.99753	27 0.99498	33 0.99243	40 0.96766	43 0.97131			
6	1740.3	303.0	0.0104	10.31									21 0.98915	28 0.99534	

WIND TUNNEL TEST CONDITIONS..... Q 6.640 PT 17.902 PS 10.621 R/L 5.1 MACH 0.901 TFMP 101.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 POLL 0.0
 AVERAGE MIN-1/NOZZLE PARAMETERS.. PTC= 1735.5 TC= 302.9 PTC/PSA= 163.41 PSM(22)/PSA= 0.9701
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2030. HEATER TOTAL TEMPERATURE= 340.

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TEST 575 RUN 151/0

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WIND TUNNEL TEST CONDITIONS..... Q..... 0.6426 PT..... 18.004 PS..... 10.658 R/L..... 5.1 MACH..... 0.899 TFMP..... 101.1
MODEL ATTITUDE..... ALPHA..... 0.00 BETA..... 0.00 ROLL..... 0.0
AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1421.2 TC= 300.2 PTC/PSA= 133.34 PSNI221/PSA= 0.9418
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1645. HEATER TOTAL TEMPERATURE= 335.

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08 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 152/0

FRAME	PSA	PI	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	11.75	1.83.73	91.0	94.1	96.2	97.5	0.0	251.4	297.0
2	11.64	1.84.49	91.0	94.1	96.2	99.7	0.0	242.3	298.7

FR	PTC	IF P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1081.5	21.0	0.0117	4.78	5 1.00179	6 0.99916	11 0.97219	16 0.98338	23 0.97039	29 1.01154	34 0.92237	35 1.04800			
2	1101.5	207.0	0.0107	4.78	4 0.95703	7 0.98158	12 0.97869	17 1.01623	24 0.97616	30 0.99854	41 0.99632	36 1.02381			
3	1082.7	255.3	1.0114	4.79	3 0.89818	8 0.99493	13 0.98266	18 0.99746	25 0.97219	31 0.99168	42 0.90252	37 1.02634			
4	1086.6	277.0	1.0115	4.79	2 1.08266	9 0.98483	14 0.98374	19 0.99205	26 0.98663	32 0.98085	39 0.98880	38 0.92165			
5	1111.6	297.0	0.0114	4.77	1 1.15125	10 0.97291	15 0.98735	20 0.98049	27 0.99205	33 0.96389	40 0.88916	43 0.89421			
6	1086.6	297.8	0.0108	4.66						21 0.95233	28 0.98266				

WIND TUNNEL TEST CONDITIONS..... 0 5.992 PT 18.004 PS 10.714 R/L 5.1 MACH 0.894 TEMP 101.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 3.00 POLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1088.5 TC= 247.3 PTC/PSA= 101.59 PSA(22)/PSA= 0.9111
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1255. HEATER TOTAL TEMPERATURE= 332.

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08 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUJESCENT PHASE

TEST 575 RUN 15370

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.75	835.52	81.9	89.7	92.8	93.2	94.0	237.6	369.8
2	10.74	850.78	83.7	91.0	93.6	96.2	97.0	232.4	349.4

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	836.0	300.0	0.0108	9.46	5 0.99885	6 0.98461	11 0.96446	16 0.97525	23 0.96482	29 1.00348	34 0.98496	35 1.04111			
2	840.8	300.4	0.0108	9.45	4 0.95078	7 0.92561	12 0.97022	17 1.00728	24 0.96770	30 0.98821	41 0.84750	36 1.01484			
3	846.6	300.9	0.0108	9.45	3 0.89032	8 0.96749	13 0.97345	18 0.98749	25 0.96230	31 0.97957	42 0.65218	37 1.01520			
4	850.8	300.9	0.0107	9.46	2 1.07530	9 0.97741	14 0.97525	19 0.98065	26 0.97613	32 0.96698	39 0.84174	38 0.88745			
5	849.2	300.9	0.0108	9.46	1 1.14763	10 0.96806	15 0.98173	20 0.97022	27 0.98605	33 0.94862	40 0.84318	43 0.84786			
6	852.4	301.3	0.0108	9.46				21 0.94718	28 0.98677						

WIND TUNNEL TEST CONDITIONS..... Q 5.976 PT 10.011 PS 10.748 R/L 5.1 MACH 0.801 TEMP 100.8
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 846.0 TC= 300.7 PTC/PSA= 78.71 PSM(27)/PSA= 0.8799
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 855. HEATER TOTAL TEMPERATURE= 325.

04 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 154/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.69	376.04	90.2	93.2	95.8	97.5	0.0	258.8	382.8	283.1
2	10.69	379.73	91.0	91.9	95.4	97.5	0.0	247.1	365.4	289.2

FR	PTC	TC	P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	377.6	283.1	0.0107	9.12	5 0.99740	6 0.98474	11 0.96413	16 0.97390	23 0.96558	29 1.00174	34 0.85226	35 1.04044				
2	378.7	285.3	0.0107	9.12	4 0.95147	7 0.97570	12 0.96992	17 1.00680	24 0.96775	30 0.98691	41 0.78223	36 1.01548				
3	375.0	285.3	0.0108	9.11	3 0.88810	8 0.98872	13 0.97426	18 0.98655	25 0.96305	31 0.97787	42 0.78548	37 1.01476				
4	380.3	285.7	0.0106	9.10	2 1.07660	9 0.97679	14 0.97390	19 0.97751	26 0.97643	32 0.96160	39 0.77499	38 0.85528				
5	377.6	286.1	0.0107	9.10	1 1.14893	10 0.96775	15 0.98077	20 0.96485	27 0.98583	33 0.93954	40 0.77644	43 0.78078				
6	378.7	286.6	0.0107	9.10				21 0.93737	28 0.98402							

WIND TUNNEL TEST CONDITIONS..... Q 6.004 PT 18.004 PS 10.696 R/L 5.1 MACH 0.896 TEMP 100.5
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 378.0 TC= 285.3 PTC/PSA= 35.34 PSM(22)/PSA= 0.8517
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 495. HEATER TOTAL TEMPERATURE= 325.

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08 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 155/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.72	370.25	87.1	90.6	91.9	91.0	0.0	309.5	543.6
2	10.72	375.52	86.4	90.2	91.9	93.2	0.0	297.4	510.7

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	367.1	341.2	0.0107	9.14	5	0.99858	6	0.98632	11	0.96576	16	0.97514	23	0.96648	29	1.00254	34	0.85974	35	1.04185
2	370.4	345.1	0.0107	9.14	4	0.95206	7	0.97586	12	0.97117	17	1.00687	24	0.96865	30	0.98704	41	0.78292	36	1.01517
3	372.9	347.2	0.0106	9.14	3	0.89039	8	0.98812	13	0.97405	18	0.98560	25	0.96251	31	0.97622	42	0.78545	37	1.01408
4	373.9	348.1	0.0114	9.13	2	1.07719	9	0.97766	14	0.97405	19	0.97802	26	0.97694	32	0.96107	39	0.77571	38	0.85649
5	372.6	350.7	0.0107	9.14	1	1.14896	10	0.96951	15	0.98127	20	0.96540	27	0.98596	33	0.93943	40	0.77751	43	0.78220
6	376.0	350.7	0.0106	9.14																

WIND TUNNEL TEST CONDITIONS..... 0 5.981 PT 17.998 PS 10.726 9/L 5.1 MACH 0.893 TEMP 101.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 372.2 TCM= 347.2 PTC/PSA= 34.70 PSM(22)/PSA= 0.8520
 HEATER PARAMETERS..... WATER TOTAL PRESSURE= 410. HEATER TOTAL TEMPERATURE= 415.

04 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 156/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.74	746.57	86.9	90.6	89.3	87.6	0.0	289.2	517.6
2	10.77	760.25	91.5	92.3	92.3	92.8	0.0	283.1	479.5

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	742.9	372.8	0.0108	9.38	5 0.99796	6 0.98646	11 0.96597	16 0.97675	23 0.96561	29 1.00335	34 0.98256	35 1.04162			
2	740.3	374.1	0.0109	9.39	4 0.95302	7 0.97747	12 0.97244	17 1.00767	24 0.97028	30 0.98825	41 0.83331	36 1.01522			
3	750.8	376.7	0.0108	9.41	3 0.89479	8 0.98969	13 0.97531	18 0.98825	25 0.96489	31 0.97963	42 0.83834	37 1.01629			
4	750.3	376.0	0.0108	9.40	2 1.07741	9 0.97891	14 0.97567	19 0.98035	26 0.97817	32 0.96525	39 0.82720	38 0.87969			
5	754.5	378.9	0.0108	9.42	1 1.14854	10 0.97208	15 0.98394	20 0.97028	27 0.98897	33 0.94763	40 0.83044	43 0.83469			
6	755.5	379.8	0.0109	9.42											

WIND TUNNEL TEST CONDITIONS..... 0 5.957 PT 17.992 PS 10.760 R/L 5.1 MACH 0.889 TEMP 101.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 749.0 TC= 376.7 PTC/PSA= 69.62 PSM(221)/PSA= 0.8741
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 840. HEATER TOTAL TEMPERATURE= 435.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUJFSCENT PHASE

TEST 575 RUN 157/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEET--PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.74	1137.09	97.1	98.4	102.7	104.0	9.0	307.4	480.5
2	10.74	1158.15	98.8	98.6	102.7	106.0	0.0	299.1	452.6

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1138.2	386.7	0.0107	9.86	5 0.99843	6 0.98697	11 0.96834	16 0.98016	23 0.96655	29 1.00667	34 0.92535	35 1.04286			
2	1147.5	387.1	0.0106	9.88	4 0.95329	7 0.97801	12 0.97407	17 1.00990	24 0.97157	30 0.99342	41 0.89992	36 1.01050			
3	1148.7	387.6	0.0106	9.89	3 0.89660	8 0.99019	13 0.97801	18 0.99342	25 0.96762	31 0.98733	42 0.90636	37 1.02136			
4	1153.4	387.3	0.0106	9.89	2 1.07617	9 0.97920	14 0.97801	19 0.98697	26 0.98089	32 0.97551	39 0.89239	38 0.92249			
5	1145.5	389.7	0.0108	9.89	1 1.14531	10 0.97300	15 0.98590	20 0.97909	27 0.99055	33 0.96333	40 0.89596	43 0.90027			
6	1159.7	391.5	0.0107	9.91											

WIND TUNNEL TEST CONDITIONS..... 0 5.938 PT 17.998 PS 10.727 9/1 5.1 MACH 0.887 TE=2 100.9
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1148.6 TC= 388.6 PTC/PSA= 106.40 PSM(22)/PSA= 0.9152
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1260. HEATER TOTAL TEMPERATURE= 445.

08 AUGUST 1973

MSFC TRANSONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RLV 15670

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEED-PIPE	72-
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.70	1488.15	81.9	87.5	90.2	91.0	0.0	308.2	466.5
2	10.71	1518.15	85.0	89.7	91.9	97.5	0.0	300.9	443.9

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1488.1	394.1	0.0105	10.18	5	0.99853	6	0.98625	11	0.98820	16	0.98481	23	0.96639	29	1.01334	34	0.96061	35	1.04331
2	1502.4	394.5	0.0105	10.18	4	0.95267	7	0.97867	12	0.97398	17	1.01478	24	0.97072	30	0.99998	41	0.94581	36	1.02309
3	1520.8	396.7	0.0104	10.19	3	0.89164	8	0.99023	13	0.97467	18	0.99925	25	0.96711	31	0.99544	42	0.95520	37	1.02923
4	1517.6	397.1	0.0105	10.20	2	1.08087	9	0.97903	14	0.98156	19	0.99673	26	0.98481	32	0.98878	39	0.93967	38	0.95953
5	1515.0	398.0	0.0105	10.19	1	1.15201	10	0.97217	15	0.98950	20	0.99131	27	0.99492	33	0.98156	40	0.94364	43	0.94617
6	1520.3	398.0	0.0105	10.20									21	0.97867	28	0.99348				

WIND TUNNEL TEST CONDITIONS..... 0 5.990 PT 17.998 PS 10.711 R/L 5.1 MACH 0.894 TEMP 101.4
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1510.7 TC= 396.4 PTC/PSA= 141.04 PSM1221/PSA= 0.9515
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1670. HEATER TOTAL TEMPERATURE= 450.

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08 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 15970

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.60	1803.41	105.3	101.9	103.6	103.2	0.0	289.6	473.0
2	10.66	1832.88	105.8	102.3	103.6	105.4	0.0	291.3	443.0

FR	PTC	TC P17/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	1819.7	397.1	0.0103	10.42	5	0.99875	6	0.98641	11	0.96646	16	0.98750	23	0.96610	29	1.01761	34	0.98714	35	1.04119
2	1816.0	398.0	0.0104	10.43	4	0.95195	7	0.97625	12	0.97299	17	1.01725	24	0.96900	30	1.00636	41	0.97843	36	1.02704
3	1802.4	396.7	0.0105	10.43	3	0.88773	8	0.98895	13	0.97916	18	1.00383	25	0.96610	31	1.00274	42	0.98677	37	1.03466
4	1836.0	396.7	0.0103	10.43	2	1.08219	9	0.97988	14	0.98351	19	1.00310	26	0.98677	32	0.99911	39	0.97117	38	0.98532
5	1830.3	398.0	0.0104	10.44	1	1.15438	10	0.97154	15	0.99222	20	1.00056	27	0.99766	33	0.99657	40	0.97580	43	0.97916
6	1829.2	397.1	0.0104	10.43									21	0.99403	28	0.99838				

WIND TUNNEL TEST CONDITIONS..... Q 6.024 PT 18.004 PS 10.662 R/L 5.1 MACH 0.899 TEMP 101.6
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1822.3 TC= 397.2 PTC/PSA= 170.91 PSM(22)/PSA= 0.9783
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2025. HEATER TOTAL TEMPERATURE= 445.

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TEST #75 RUN 159/1

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WIND TUNNEL TEST CONDITIONS.....	Q	6.052	PT	18.023	PS	10.636	P/L	5.2	MACH	0.902	TEMP	97.9
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1809.6	TC=	378.9	PTC/PS4=	170.14	PSM(22)/PS4= 0.9756					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2025.					HEATER TOTAL TEMPERATURE= 440.						

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 16070

TEMPERATURE DATA---DEGREES FAHRENHEIT---										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1	7.45	1812.36	109.3	102.3	105.8	111.4	0.0	303.9	460.5	395.8
2	7.44	1857.09	108.8	101.4	104.5	115.3	0.0	304.3	435.2	394.9

FR	PTC	TC	P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1809.2	395.8	0.0105	7.11	5 0.90454	6 1.00522	11 0.99283	16 1.00935	23 0.92106	29 1.03207	34 0.95720	35 1.13068			
2	1838.7	394.5	0.0104	7.12	4 0.80232	7 0.98457	12 0.96443	17 1.04343	24 1.00264	30 1.00161	41 0.94172	36 0.99489			
3	1832.4	394.1	0.0104	7.12	3 0.96392	8 1.00264	13 0.95359	18 1.01348	25 0.94223	31 0.98199	42 0.95100	37 1.03258			
4	1840.8	395.4	0.0104	7.13	2 1.28763	9 0.97527	14 1.02226	19 1.01038	26 1.01864	32 0.98973	39 0.93965	38 0.93707			
5	1851.3	395.8	0.0103	7.12	1 1.38724	10 0.98147	15 1.01142	20 0.98354	27 1.02010	33 0.98147	40 0.95307	43 0.94636			
6	1841.3	395.4	0.0104	7.13									21 0.97889	28 1.03155	

WIND TUNNEL TEST CONDITIONS..... Q 7.459 PT 17.998 PS 7.492 R/L 5.4 MACH 1.193 TEMP 102.0
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1835.6 TC= 395.1 PTC/PSA= 245.01 PSM(22)/PSA= 0.9507
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2030. HEATER TOTAL TEMPERATURE= 450.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 160/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEETED-PIPE	TCH
			SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]		
1	7.34	1778.70	122.3	114.5	120.5	113.6	0.0	327.3	449.1
2	7.35	1780.28	121.8	111.0	117.5	114.5	0.0	321.2	428.3

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	1790.3	380.2	0.0104	7.84	5	0.91097	6	0.98680	11	1.02945	16	1.07000	23	1.07263	29	1.10581	34	1.07053	35	1.16057
2	1772.9	379.8	0.0105	7.85	4	0.81566	7	1.07895	12	1.02050	17	1.12582	24	1.07737	30	1.08843	41	1.05157	36	1.10265
3	1791.3	381.1	0.0104	7.85	3	0.95468	8	1.12003	13	1.01155	18	1.10791	25	1.00997	31	1.08580	42	1.06526	37	1.13477
4	1779.8	380.6	0.0104	7.85	2	1.31117	9	1.11845	14	0.99891	19	1.10528	26	1.05684	32	1.08211	39	1.04262	38	1.04525
5	1796.1	380.2	0.0104	7.86	1	1.43966	10	1.07474	15	1.01892	20	1.08844	27	1.07895	33	1.08632	40	1.06368	43	1.05368
6	1799.8	380.2	0.0104	7.86									21	1.09422	28	1.08106				

WIND TUNNEL TEST CONDITIONS..... 0 7.503 PT 18.004 PS 7.346 R/L 5.5 MACH 1.208 TEMP 97.6
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1788.4 TC= 380.3 PTC/PSA= 243.46 PSM[22]/PSA= 1.0699
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2035. HEATER TOTAL TEMPERATURE= 430.

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TEST 575 RUN 16170

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WIND TUNNEL TEST CONDITIONS..... Q 7.462 PT 18.004 PS 7.492 R/L 5.4 MACH 1.193 TEMP 102.2
MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1442.6 TC= 389.1 PTC/PSA= 192.56 PSM(22)/P* A= 0.9255
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1630. HEATER TOTAL TEMPERATURE= 430.

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 HSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 10270

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM
1	7.47	1048.67	99.7	96.7	98.0	104.0	0.0	304.3	476.0
2	7.47	1103.94	99.7	97.1	98.0	108.4	0.0	301.3	446.5

FR	PTC	TC	P47/PTC	PORT-22 NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO
1	1049.2	380.2	0.0107	6.77	5 0.90371	6 1.00360	11 0.98859	16 1.00930	23 0.92545	29 1.03621	34 0.91872	35 1.13248			
2	1054.5	383.2	0.0108	6.78	4 0.80071	7 0.99066	12 0.96944	17 1.04656	24 1.00774	30 1.08671	41 0.78622	36 0.99325			
3	1065.5	382.8	0.0107	6.79	3 0.96168	8 1.00671	13 0.95133	18 1.01447	25 0.94511	31 0.98290	42 0.79864	37 1.03362			
4	1087.1	363.2	0.0106	6.78	2 1.28310	9 0.98031	14 1.02534	19 1.01292	26 1.02016	32 0.99377	39 0.78673	38 0.91716			
5	1093.9	385.0	0.0107	6.78	1 1.38869	10 0.98549	15 1.01395	20 0.98756	27 1.02275	33 0.98497	40 1.00899	43 0.79864			
6	1100.8	385.0	0.0107	6.78				21 0.97824	28 1.03155						

WIND TUNNEL TEST CONDITIONS.....	Q	7.464	PT	17.998	PS	7.473	R/L	5.4	MACH	1.195	TEMP	101.9
MODEL ATTITUDE.....	ALPHA	-0.62	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1075.2	TC=	363.2	PTC/PSA=	143.87	PSH1221/PSA=	0.9070				
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	1240.	HEATER TOTAL TEMPERATURE=	430.								

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENCE PHASE

TEST 575 RUN 163/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.42	785.52	101.4	96.7	97.1	102.7	0.0	341.6	486.1	380.2
2	7.42	806.57	101.4	94.5	96.2	106.2	0.0	326.4	459.5	382.8

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSA/PSA NO	PSI/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	746.0	380.2	0.0108	6.69	5 0.90496	6 1.00551	11 0.98519	16 1.01332	23 0.93517	29 1.04197	34 0.91746	35 2.76540
2	787.6	380.2	0.0109	6.70	4 0.78617	7 0.99613	12 0.97732	17 1.05187	24 1.01436	30 1.01593	41 0.71740	36 0.99613
3	798.7	380.2	0.0107	6.70	3 0.95914	8 0.99873	13 0.95497	18 1.01957	25 0.94299	31 0.96415	42 0.72678	37 1.03206
4	796.0	382.8	0.0108	6.70	2 1.28788	9 0.99040	14 1.02374	19 1.01593	26 1.02166	32 0.99717	39 0.71636	38 0.91694
5	809.3	343.2	0.0107	6.70	1 1.38218	10 0.98519	15 1.01280	20 0.99925	27 1.02218	33 0.94936	40 0.73928	43 0.72521
6	803.4	382.4	0.0108	6.70				21 0.97685	28 1.02687			

WIND TUNNEL TEST CONDITIONS..... 0 7.478 PL 17.99R PS 7.424 R/L 5.14 MACH 1.200 IFMP 102.2
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 795.3 TC= 381.5 PTC/PSA= 107.13 PSM(22)/PSA= 0.9022
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 850. HEATER TOTAL TEMPERATURE= 425.

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MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 164/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.43	380.25	99.7	95.4	99.3	99.7	0.0	348.1	359.8
2	7.43	389.73	99.7	94.5	95.4	101.9	0.0	330.8	366.8

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	377.1	359.4	0.0106	6.68	5	0.98463	6	1.00658	11	0.98838	16	1.01283	23	0.92960	29	1.04196	34	0.91191	35	1.12883
2	377.6	361.1	0.0107	6.68	4	0.78706	7	0.99046	12	0.97329	17	1.04820	24	1.01127	30	1.01231	41	0.56598	36	0.99898
3	379.7	362.8	0.0107	6.68	3	0.95509	8	0.99774	13	0.95248	18	1.01751	25	0.94260	31	0.98214	42	0.57722	37	1.03311
4	382.9	364.1	0.0106	6.68	2	1.28905	9	0.98526	14	1.02271	19	1.01803	26	1.02115	32	0.99774	39	0.56390	38	0.91815
5	381.8	365.4	0.0107	6.68	1	1.37697	10	0.98005	15	1.01075	20	0.99462	27	1.02167	33	0.98786	40	0.58418	43	0.57066
6	383.9	365.9	0.0107	6.68																

WIND TUNNEL TEST CONDITIONS..... 0 7.475 PT 17.998 PS 7.436 R/L 5.4 MACH 1.199 TEMP 102.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 WGL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 380.5 TC= 363.1 PTC/PSA= 51.17 PSM(22)/PSA= 0.8984
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 425. HEATER TOTAL TEMPERATURE= 425.

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MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST, NON-QUIESCENT PHASE

TEST 575 RUN 164/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.42	419.23	81.5	84.1	85.8	88.9	0.0	273.5	328.6
2	7.40	416.59	81.1	84.5	86.3	89.7	0.0	270.1	336.0

FR	PTC	TC	P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	416.1	328.2	0.0107	7.22	5 0.90679	6 0.98509	11 1.02007	16 1.09002	23 1.07324	29 1.09681	34 0.99031	35 1.15371			
2	416.6	331.2	0.0108	7.24	4 0.80290	7 1.07854	12 1.00598	17 1.12866	24 1.06653	30 1.09942	41 0.65308	36 1.11508			
3	415.5	331.6	0.0108	7.24	3 0.94960	8 1.11874	13 1.02007	18 1.10986	25 0.99971	31 1.09159	42 0.65986	37 1.12396			
4	418.2	334.2	0.0108	7.24	2 1.23101	9 1.10255	14 1.01120	19 1.11038	26 1.06914	32 1.09107	39 0.64681	38 1.00128			
5	416.6	335.1	0.0108	7.24	1 1.41265	10 1.05870	15 1.09942	20 1.11352	27 1.09264	33 1.08741	40 0.65934	43 0.66031			
6	417.6	335.5	0.0108	7.23						21 1.09159	28 1.09159				

WIND TUNNEL TEST CONDITIONS..... Q 7.496 PT 18.023 PS 7.409 R/L 5.5 MACH 1.202 TEMP 98.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 416.8 TC= 332.6 PTC/PSA= 56.25 PSM(22)/PSA= 0.9765
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 425. HEATER TOTAL TEMPERATURE= 420.

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MSFC TRISOLIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST, NO. QUIESCENT PHASE

TEST 975 NO. 16570

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCN
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	5.17	410.20	62.0	72.4	82.4	85.0	0.0	369.8	363.7
2	5.15	406.51	62.0	72.4	83.2	84.1	0.0	366.3	368.9
3	5.20	408.62	62.9	73.7	81.5	87.1	0.0	358.5	372.0
4	5.18	407.57	63.3	75.4	83.2	88.0	0.0	354.6	374.6
5	5.18	410.20	63.7	75.0	82.4	88.0	0.0	350.3	374.6
6	5.17	412.30	64.6	74.3	84.1	88.4	0.0	346.8	376.7

FR	PTC	TC	P47/PTC	PORT-22 NO	PSM/PSA NO	PS4/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	409.7	364.1	0.0111	4.96	5 0.88246	6 0.90934	11 0.98400	16 0.92801	23 0.96533	29 0.94294	34 0.98773	35 0.97131			
2	404.9	368.5	0.0111	4.98	4 0.80333	7 0.96011	12 0.95264	17 0.92950	24 1.01984	30 1.01312	41 0.64505	36 1.13257			
3	407.0	372.0	0.0109	4.97	3 1.02581	8 1.02730	13 0.96981	18 0.96011	25 0.94518	31 1.03551	42 0.65177	37 1.06538			
4	407.0	375.4	0.0110	4.97	2 1.35207	9 1.00042	14 0.95936	19 0.98923	26 0.92651	32 1.02357	39 0.63310	38 1.07135			
5	408.6	374.6	0.0110	4.95	1 1.39611	10 0.99370	15 0.95190	20 0.98251	27 0.94368	33 1.02282	40 0.64430	43 0.63833			
6	411.3	377.6	0.0109	4.97											

WIND TUNNEL TEST CONDITIONS..... 0 7.751 PT 10.011 PS 5.181 R/L 5.3 MACH 1.462 TEMP 192.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.8
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 408.1 TC= 372.0 PTC/PSA= 78.77 PSM(22)/PSA= 0.9585
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 475. HEATER TOTAL TEMPERATURE= 425.

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SFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST... ON-QUIESCENT PHASE

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MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 166/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.17	756.51	72.4	81.5	89.7	95.8	0.0	382.8	511.5	382.4
2	5.18	757.94	72.8	80.6	89.3	95.8	0.0	376.3	497.2	385.4
3	5.18	757.57	73.7	81.9	89.3	96.2	0.0	371.5	486.4	388.4
4	5.21	761.25	74.6	82.8	89.7	96.7	0.0	365.4	474.7	388.4
5	5.18	762.30	74.6	81.5	89.3	96.7	0.0	361.5	465.6	388.4
6	5.20	769.15	75.0	83.2	90.2	97.5	0.0	357.6	458.2	388.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	757.6	382.8	0.0110	4.97	5 0.88193	6 0.90803	11 0.97885	16 0.93785	23 0.96394	29 0.94232	34 0.98705	35 0.97363			
2	757.0	385.4	0.0109	4.96	4 0.80142	7 0.95797	12 0.95350	17 0.93114	24 1.01389	30 1.00420	41 0.77905	36 1.12944			
3	757.6	388.9	0.0109	4.98	3 1.02880	8 1.01240	13 0.96170	18 0.96096	25 0.94083	31 1.03253	42 0.78725	37 1.06607			
4	762.8	389.3	0.0109	4.99	2 1.35757	9 1.00121	14 0.96841	19 0.97810	26 0.92815	32 1.02060	39 0.76862	38 1.06607			
5	761.8	388.4	0.0110	4.97	1 1.43510	10 0.99972	15 0.94605	20 0.99078	27 0.95127	33 1.02656	40 0.78129	43 0.77309			
6	768.1	389.7	0.0110	4.96									21 1.02134	28 0.94008	

WIND TUNNEL TEST CONDITIONS..... Q 7.752 PT 18.013 PS 5.188 R/L 5.3 MACH 1.461 TEMP 102.8
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 760.8 TC= 387.4 PTC/PSA= 146.64 PSM(22)/PSA= 0.9585
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 875. HEATER TOTAL TEMPERATURE= 435.

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OF POOR QUALITY

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TEST 575 RUN 167/0

WIND TUNNEL TEST CONDITIONS.....	Q	7.742	PT	18.009	PS	5.081	R/L	5.3	MACH	1.476	TEMP	102.7
MODEL ATTITUDE.....	ALPHA	0.60	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1154.7	TC=	392.0	PTC/PSA=	227.26	PSN(221)/PSA= 0.9714					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1310.					HEATER TOTAL TEMPERATURE= 440.						

ORIGINAL PAGE IS
OF POOR QUALITY

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TC	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.75	1562.83	112.3	99.4	103.2	94.1	0.0	334.2	491.8	395.8
2	5.02	1551.78	101.9	99.8	102.7	94.9	0.0	333.8	476.4	401.9
3	5.05	1568.62	101.9	98.4	102.3	94.5	0.0	331.6	463.4	402.7
4	5.01	1554.94	101.9	98.4	102.3	95.8	0.0	330.8	454.3	401.9
5	5.05	1569.15	102.3	98.4	101.9	97.1	0.0	329.5	447.4	401.9
6	5.02	1597.04	101.9	97.5	101.0	98.0	0.0	326.4	440.9	401.0

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1566.0	399.3	0.0106	4.92	5 0.88385	6 0.86773	11 0.96909	16 0.95604	23 0.93914	29 0.95757	34 0.98752	35 0.98061		
2	1551.8	401.9	0.0106	4.93	4 0.79708	7 0.95527	12 0.96371	17 0.93761	24 0.98061	30 0.97830	41 0.95296	36 1.14417		
3	1568.6	403.2	0.0106	4.94	3 0.97293	8 0.98906	13 0.93377	18 0.96218	25 0.94145	31 1.00211	42 0.97139	37 1.06508		
4	1559.1	402.3	0.0107	4.95	2 1.31541	9 1.01593	14 0.93837	19 0.94605	26 0.93377	32 1.04972	39 0.94836	38 1.05202		
5	1571.3	402.3	0.0107	4.93	1 1.38068	10 1.00288	15 0.98902	20 0.97984	27 0.94068	33 1.02668	40 0.97830	43 0.95527		
6	1599.7	401.4	0.0105	4.93									21 0.99136	28 0.93530

WIND TUNNEL TEST CONDITIONS.....	Q	7.746	PT	18.027	PS	5.037	R/L	5.3	MACH	1.482	TEMP	103.7
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1569.4	TC=	401.7	PTC/PSA=	311.57	PSH1221/PSA= 0.9793					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1750.					HEATER TOTAL TEMPERATURE= 450.						

TEST 575 RUN 169/0

WIND TUNNEL TEST CONDITIONS.....	Q	7.736	PT	18.013	PS	4.998	R/L	5.3	MACH	1.487	TEMP	103.1
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1845.2	TC=	410.5	PTC/PSA=	369.16	PSN(22)/PSA= 0.9949					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2050.					HEATER TOTAL TEMPERATURE= 470.						

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SFC TRISONIC WIND TUNNEL - MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NO-QUIESCENT PHASE

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WIND TUNNEL TEST CONDITIONS.....		Q	7.745	PT	18.011	PS	5.102	R/L	5.3	MACH	1.473	TE1P	103.1
MODEL ATTITUDE.....		ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..		PTC	1827.7	TC	413.9	PTC/PSA	350.23	PSM(22)/PSA= 1.0967					
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE= 2040.					HEATER TOTAL TEMPERATURE= 470.						

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 155/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----						TC-
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	
1	7.46	391.85	95.4	92.3	94.1	94.1	0.0	437.8 704.0	396.2
2	7.46	391.32	94.9	91.9	93.6	94.1	0.0	430.5 689.7	409.2
3	7.47	391.85	95.4	92.8	94.1	95.4	0.0	424.0 577.6	416.6
4	7.46	395.01	95.4	93.2	94.1	96.7	0.0	416.2 664.6	421.6
5	7.46	402.38	95.4	91.5	93.2	97.1	0.0	409.2 652.0	426.1
6	7.46	400.27	95.4	94.1	94.5	99.3	0.0	403.6 641.6	430.5

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	390.3	396.4	0.0107	6.72	5	0.90300	6	1.00667	11	0.99008	16	1.00771	23	0.92321	29	1.03881	34	0.91181	35	1.14974
2	390.3	406.4	0.0106	6.71	4	0.79829	7	0.99008	12	0.96987	17	1.04659	24	1.01082	30	1.00512	41	0.57176	36	0.98853
3	389.7	417.0	0.0107	6.72	3	0.95743	8	1.01082	13	0.95794	18	1.01289	25	0.94239	31	0.98127	42	0.57746	37	1.03363
4	392.4	421.8	0.0107	6.73	2	1.28866	9	0.98283	14	1.01963	19	1.01289	26	1.02170	32	0.99216	39	0.57020	38	0.91336
5	400.8	425.7	0.0105	6.73	1	1.36279	10	0.98334	15	1.01237	20	0.98801	27	1.02170	33	0.98542	40	0.58472	43	0.57798
6	397.6	430.0	0.0106	6.72																

WIND TUNNEL TEST CONDITIONS..... Q 7.474 PT 18.011 PS 7.462 R/L 5.5 MACH 1.196 TEMP 100.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 393.5 TC= 416.9 PTC/PSA= 52.74 PSM(22)/PSA= 0.9007
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 425. HEATER TOTAL TEMPERATURE= 525.

FRAME	PSA	PTC	TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SPIN(1)	SKT(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.36	1119.75	110.1	101.9	105.6	104.0	0.0	379.3	603.4	450.4
2	7.37	1118.69	110.1	102.3	105.6	105.3	0.0	376.7	586.5	456.5
3	7.34	1139.22	110.1	101.9	104.5	106.2	0.0	373.3	570.9	458.7
4	7.36	1149.22	110.6	102.7	104.9	108.4	0.0	370.7	558.4	460.0
5	7.36	1134.48	109.7	101.4	103.6	110.1	0.0	366.1	547.5	461.7
6	7.37	1148.69	110.1	101.0	103.2	111.4	0.0	365.0	538.8	460.4

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	1118.7	451.3	0.0107	6.88	5	0.88885	6	1.00652	11	0.98551	16	1.00547	23	0.94821	29	1.03699	34	0.93140	35	1.12367
2	1120.8	456.5	0.0107	6.87	4	0.76645	7	1.00494	12	0.98656	17	1.04172	24	1.00337	30	1.02018	41	0.80217	36	0.99496
3	1135.5	450.2	0.0107	6.88	3	0.94190	8	0.97710	13	0.95714	18	1.03173	25	0.94506	31	0.99234	42	0.81005	37	1.02333
4	1144.0	460.4	0.0106	6.89	2	1.29229	9	0.99654	14	1.00967	19	1.01492	26	1.01808	32	0.97920	39	0.80532	38	0.91459
5	1137.1	461.3	0.0108	6.87	1	1.37162	10	0.98235	15	1.00810	20	1.00442	27	1.02701	33	0.99391	40	0.82843	43	0.81425
6	1148.2	459.5	0.0107	6.87							21	0.98183	28	1.01703						

WIND TUNNEL TEST CONDITIONS.....	U	7.503	PT	18.013	PS	7.363	R/L	5.5	MACH	1.207	TEMP	99.9	
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0							
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1134.0	TC=	457.9	PTC/PSA=	154.02	PSM(22)/PSA= 0.9339						
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=					1240.	HEATER TOTAL TEMPERATURE=						520.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 188/0

-----TEMPERATURE DATA---DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	7.37	1459.75	101.0	95.4	96.4	96.2	0.0	373.3	599.5	438.3
2	7.35	1467.11	100.6	95.4	97.5	98.4	0.0	370.2	575.7	445.6
3	7.35	1472.90	100.6	96.2	98.0	99.7	0.0	368.1	557.1	448.7
4	7.36	1487.64	101.0	95.8	97.5	101.9	0.0	364.6	540.1	450.8
5	7.35	1490.80	100.6	94.5	97.1	103.2	0.0	362.0	527.6	450.4
6	7.37	1500.27	100.6	95.8	97.1	105.8	0.0	359.8	518.5	453.6

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1459.2	437.8	0.0106	6.85	5	0.89035	6	1.00651	11	0.98706	16	1.00861	23	0.94764	29	1.03884	34	0.94501	35	1.12634
2	1471.3	443.9	0.0105	6.84	4	0.76421	7	1.00493	12	0.98706	17	1.04225	24	1.00388	30	1.02017	41	0.87406	36	0.99494
3	1471.3	446.2	0.0106	6.86	3	0.94238	8	0.98128	13	0.95710	18	1.02963	25	0.94659	31	0.99126	42	0.86352	37	1.02490
4	1485.0	450.8	0.0105	6.86	2	1.29400	9	0.99337	14	1.00703	19	1.01597	26	1.01649	32	0.97602	39	0.87563	38	0.92031
5	1486.6	449.5	0.0106	6.85	1	1.37127	10	0.98443	15	1.00651	20	1.00440	27	1.02911	33	0.99442	40	0.89561	43	0.88457
6	1498.2	453.0	0.0105	6.87									21	0.98548	28	1.01860				

WIND TUNNEL TEST CONDITIONS..... 0 7.506 PT 18.017 PS 7.359 R/L 5.5 MACH 1.207 TEMP 99.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1478.6 TC= 447.2 PTC/PSA= 200.92 PSM(22)/PSA= 0.9313
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1630. HEATER TOTAL TEMPERATURE= 510.

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MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 189/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.40	1819.75	92.3	91.0	92.8	96.2	0.0	389.7	609.9
2	7.39	1841.33	92.8	91.5	93.2	98.0	0.0	385.8	581.3
3	7.41	1842.38	92.8	92.3	94.5	101.4	0.0	382.8	561.0
4	7.40	1868.17	92.3	91.9	93.2	103.6	0.0	378.9	544.1
5	7.40	1876.07	92.3	91.5	93.2	106.2	0.0	375.9	533.2
6	7.40	1860.28	92.8	93.6	94.1	109.7	0.0	375.0	528.0

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1819.8	459.5	0.0104	7.06	5 0.88419	6 1.00647	11 0.98871	16 1.00856	23 0.93645	29 1.03626	34 0.96258	35 1.12719	
2	1840.3	468.6	0.0104	7.07	4 0.76975	7 1.00438	12 0.97930	17 1.05089	24 1.00856	30 1.01797	41 0.94429	36 0.99811	
3	1843.4	471.2	0.0105	7.08	3 0.94951	8 0.98557	13 0.95422	18 1.02267	25 0.94429	31 0.98662	42 0.95578	37 1.03051	
4	1864.0	473.8	0.0104	7.02	2 1.29702	9 0.98766	14 1.01849	19 1.01327	26 1.01901	32 0.99132	39 0.94795	38 0.93958	
5	1875.5	473.4	0.0134	7.09	1 1.39631	10 0.98191	15 1.00700	20 1.00491	27 1.02215	33 0.99289	40 0.96205	43 0.95422	
6	1859.8	475.6	0.0104	7.32					21 0.97982	28 1.01797			

WIND TUNNEL TEST CONDITIONS..... 0 7.494 PT 18.017 PS 7.402 R/L 5.5 MACH 1.203 TEMP 99.4
 MODEL ATTITUDE..... ALPHA 0.00 8FPA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1850.5 TC= 470.4 PTC/PSA= 250.00 PSM(221)/PSA= 0.9563
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2020. HEATER TOTAL TEMPERATURE= 538.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 191/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRA#E	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM	
1	10.60	1469.73	107.5	102.7	104.5	102.7	0.0	390.6	597.8	455.2
2	10.60	1452.89	107.5	103.2	104.0	103.6	0.0	366.7	580.0	462.6
3	10.63	1473.41	107.5	101.9	103.6	104.5	0.0	382.4	565.3	466.9
4	10.62	1477.10	108.0	103.2	104.0	106.2	0.0	379.8	555.3	469.5
5	10.64	1492.89	108.0	102.7	104.0	107.1	0.0	375.9	545.8	473.0
6	10.64	1497.10	108.8	101.9	104.0	108.8	0.0	373.3	539.3	474.7

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1466.2	454.3	0.0105	10.08	5	0.99731	6	0.98529	11	0.96236	16	0.98056	23	0.96455	29	1.00968	34	0.99549	35	1.03807
2	1454.5	463.0	0.0106	10.09	4	0.95181	7	0.97692	12	0.96964	17	1.01259	24	0.96746	30	0.99913	41	0.93688	36	1.02206
3	1472.9	466.0	0.0105	10.10	3	0.88520	8	0.98966	13	0.97328	18	0.99731	25	0.95982	31	0.99621	42	0.94089	37	1.02788
4	1476.6	469.5	0.0105	10.12	2	1.00284	9	0.97874	14	0.97911	19	0.99549	26	0.98165	32	0.99476	39	0.92888	38	0.95181
5	1494.5	473.0	0.0105	10.13	1	1.15236	10	0.97192	15	0.98821	20	0.99185	27	0.99367	33	0.97692	40	0.93361	43	0.93943
6	1497.1	473.0	0.0106	10.14									21	0.98165	28	0.99403				

WIND TUNNEL TEST CONDITIONS..... Q 6.048 P* 10.009 PS 10.627 R/L 5.1 MACH 0.902 TEMP 100.9
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE NOZZLE PARAMETERS.. PTC= 1476.9 TC= 466.6 PTC/PSA= 138.98 PSM(22)/PSA= 0.9513
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1645. HEATER TOTAL TEMPERATURE= 545.

SFC TRISONIC WIND TUNNEL, MOBILEVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NO-QUIESCENT PHASE

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----											
		FURNACE		MODEL		STING		FEEDER-PIPE		TCH	
1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192
193	194	195	196	197	198	199	200	201	202	203	204
205	206	207	208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225	226	227	228
229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264
265	266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312
313	314	315	316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333	334	335	336
337	338	339	340	341	342	343	344	345	346	347	348
349	350	351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370	371	372
373	374	375	376	377	378	379	380	381	382	383	384
385	386	387	388	389	390	391	392	393	394	395	396
397	398	399	400	401	402	403	404	405	406	407	408
409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426						

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1152.4	448.2	0.0107	9.82	5	0.99839	6	0.98601	11	0.96088	16	0.97690	23	0.96380	29	1.00603	34	0.98018	35	1.03917
2	1150.3	456.9	0.0107	9.84	4	0.95287	7	0.97836	12	0.96962	17	1.01040	24	0.96780	30	0.99436	41	0.89498	36	1.01914
3	1165.0	463.0	0.0106	9.83	3	0.88187	8	0.98783	13	0.97071	18	0.99038	25	0.95579	31	0.98637	42	0.89243	37	1.02023
4	1162.4	466.0	0.0107	9.86	2	1.08286	9	0.97763	14	0.97618	19	0.98746	26	0.97836	32	0.97945	39	0.88588	38	0.91974
5	1162.9	466.6	0.0107	9.86	1	1.15131	10	0.97108	15	0.98419	20	0.98018	27	0.98928	33	0.97508	40	0.88952	43	0.89862
6	1180.8	471.7	0.0107	9.88								21	0.96598	28	0.99001					

WIND TUNNEL TEST CONDITIONS..... U 6.053 PT 18.813 PS 10.623 R/L 5.1 MACH 0.902 TEMP 180.9
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1162.4 TC= 462.4 PTC/PSA= 109.42 PSN(22)/PSA= 0.9271
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1250. HEATER TOTAL TEMPERATURE= 550.

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08 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 193/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	10.72	743.43	98.0	95.8	94.5	100.1	0.0	379.8	642.5	426.1
2	10.72	745.53	98.8	96.7	95.4	100.6	0.0	374.6	625.5	434.8
3	10.72	746.06	98.8	95.4	94.9	101.4	0.0	370.2	611.2	441.3
4	10.73	749.75	98.4	94.9	94.9	102.7	0.0	367.2	598.7	445.2
5	10.73	756.17	98.8	96.7	95.4	103.6	0.0	363.3	587.8	449.3
6	10.75	763.43	99.7	97.1	96.7	105.8	0.0	361.1	576.7	452.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
(1	739,7	425,3	0.0109	9,34	5	0.99765	6	0.98648	11	0.96378	16	0.97423	23	0.96450	29	1.00269	34	0.88343	35	1.04088
2	741,3	434,8	0.0109	9,36	4	0.95225	7	0.97783	12	0.97026	17	1.00665	24	0.96918	30	0.98900	41	0.82615	36	1.01494
3	744,5	440,9	0.0108	9,35	3	0.89172	8	0.98936	13	0.97315	18	0.98576	25	0.96054	31	0.97963	42	0.83263	37	1.01422
4	747,6	444,8	0.0108	9,35	2	1.07943	9	0.97855	14	0.97459	19	0.97927	26	0.97711	32	0.96594	39	0.82219	38	0.87587
5	757,6	446,7	0.0108	9,37	1	1.14717	10	0.97495	15	0.98215	20	0.96810	27	0.98756	33	0.94829	40	0.82579	43	0.82759
6	764,0	451,7	0.0107	9,38																

WIND TUNNEL TEST CONDITIONS..... 0 5.984 PT 18.011 PS 10.736 R/L 5.1 MACH 0.892 TEMP 100.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 749.1 TC= 441.0 PTC/PSA= 69.78 PSM(22)/PSA= 0.8716
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 840. HEATER TOTAL TEMPERATURE= 545.

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TEST 575 RUN 19410

WIND TUNNEL TEST CONDITIONS.....	Q	6.036	PT	18.009	PS	10.646	R/L	5.1	MACH	0.900	TEMP	100.7.
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	412.2	TC=	412.4	PTC/PSA=	36.72	PSN(22)/PSA= 0.8497					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=					470.	HEATER TOTAL TEMPERATURE= 530.					

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TEST 575 RUN 195/G

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.66	367.57	101.4	100.6	104.5	105.3	0.0	514.6	946.8	502.0
2	10.67	371.25	102.3	101.4	104.9	105.3	0.0	504.6	926.4	514.1
3	10.67	383.88	101.9	99.7	104.0	105.8	0.0	496.8	907.3	523.7
4	10.67	394.41	102.3	100.1	103.6	106.2	0.0	489.0	889.6	531.5
5	10.68	400.72	102.3	100.6	104.0	106.7	0.0	480.8	872.2	537.5
6	10.67	407.57	102.3	101.0	103.6	107.5	0.0	473.6	855.3	541.5

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WIND TUNNEL TEST CONDITIONS..... Q 6.016 PT 18.002 PS 10.673 R/L 5.1 MACH 0.897 TEMP 102.6
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE NOZLE/NOZZLE PARAMETERS.. PTC= 386.5 TC= 525.7 PTC/PSA= 36.21 PSM[22]/PSA= C.8424
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 430. HEATER TOTAL TEMPERATURE= 600.

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10 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 195/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.67	425.99	96.7	99.3	101.0	101.7	0.0	587.0	964.1
2	10.67	423.88	97.5	100.1	101.9	101.9	0.0	576.6	941.1
3	10.69	432.83	97.5	98.8	101.4	102.3	0.0	566.2	920.3
4	10.68	433.36	98.0	100.6	101.9	104.0	0.0	557.1	903.0
5	10.68	435.46	98.4	100.1	102.3	105.3	0.0	546.7	881.7
6	10.69	439.15	98.0	100.6	101.9	106.2	0.0	539.3	864.8

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	424.4	510.2	0.0107	9.04	5 0.99603	6 0.98300	11 0.95548	16 0.97214	23 0.95983	29 0.99893	34 0.85664	35 1.66585			
2	424.4	524.1	0.0107	9.05	4 0.95078	7 0.97214	12 0.96309	17 1.00255	24 0.96091	30 0.98445	41 0.77518	36 1.01233			
	430.2	531.9	0.0106	9.05	3 0.88343	8 0.98626	13 0.96743	18 0.98445	25 0.95078	31 0.97612	42 0.78061	37 1.01233			
4	432.3	539.7	0.0107	9.05	2 1.07931	9 0.97540	14 0.96924	19 0.97576	26 0.97033	32 0.96091	39 0.77083	38 0.85483			
5	436.0	546.2	0.0107	9.05	1 1.15389	10 0.96562	15 0.97829	20 0.96417	27 0.98372	33 0.93991	40 0.77445	43 0.77409			
6	437.6	549.7	0.0107	9.05				21 0.93738	28 0.98336						

WIND TUNNEL TEST CONDITIONS..... Q 6.010 PT 18.002 PS 10.683 R/L 5.0 MACH 0.897 TEMP 107.0
 MODEL ATTITUDE..... ALPHA 9.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 430.8 TC= 533.6 PTC/PSA= 40.33 PSM(22)/PSA= 0.8473
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 420. HEATER TOTAL TEMPERATURE= 630.

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TEST 575 RUN 19670

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.58	752.30	103.6	101.9	104.9	104.9	0.0	528.4	928.1	538.8
2	10.56	750.72	103.6	101.4	104.9	105.3	0.0	517.6	896.9	551.9
3	10.58	762.30	103.6	101.4	104.5	105.8	0.0	511.1	867.4	561.0
4	10.58	764.93	104.0	101.4	104.5	106.7	0.0	501.6	840.1	565.7
5	10.56	774.93	104.5	101.0	104.5	108.0	0.0	495.1	814.6	568.3
6	10.58	786.51	104.9	101.9	105.3	109.7	0.0	488.1	792.9	571.8

[illegible]

WIND TUNNEL TEST CONDITIONS.....										6.080	PT	18.011	PS	10.574	R/L	5.1	MACH	0.926	TEMP	102.3	
MODEL ATTITUDE.....										ALPHA	0.00	BETA	0.00	ROLL	0.0	PSM1221/PSA= 0.8653					
AVERAGE MODEL/NOZZLE PARAMETERS.....										PTC=	765.8	IC=	560.3	PTC/PSA=		72.42	HEATER TOTAL TEMPERATURE= 615.				
HEATER PARAMETERS.....										HEATER TOTAL PRESSURE=				840.							

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TEST 575 RUN 197/0

WIND TUNNEL TEST CONDITIONS..... Q 6.022 PT 17.948 PS 10.658 R/L 5.1 MACH 0.899 TEMP 102.3									
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0									
AVERAGE NOZFL/NOZZLE PARAMETERS.. PTC= 1124.1 TC= 572.7 PTC/PSA= 105.47 PSM[22]/PSA= 0.9069									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1240. HEATER TOTAL TEMPERATURE= 635.									

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14 AUGUST 1973

TRISONIC WIND TUNNEL WILTS-111, ALABAMA
FLUVE TECHNOLOGY TEST...NO -21-5251 PHASE

TEST 572 NOV 1987/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
1	17.53	1412.38	98.4	98.6	104.9	105.7	0.0	538.8	553.1
2	17.50	1409.15	98.4	99.3	104.9	105.7	0.0	527.1	582.4
3	17.58	1408.99	98.6	98.8	103.0	105.3	0.0	518.0	778.1
4	17.58	1417.04	98.6	98.8	103.6	105.7	0.0	508.1	751.4
5	17.59	1444.41	99.3	98.8	104.0	108.4	0.0	499.0	726.0
6	17.58	1441.25	101.0	101.0	105.3	111.0	0.0	495.1	709.2

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1413.4	572.2	0.0107	9.93	5 0.99535	6 0.98183	11 0.95808	16 0.98110	23 0.95954	29 1.00960	34 0.95296	35 1.03700			
2	1408.6	561.3	0.0106	9.91	4 0.95113	7 0.96940	12 0.96758	17 1.01059	24 0.96356	30 0.99717	41 0.93542	36 1.02092			
3	1405.5	583.9	0.0107	9.92	3 0.87952	8 0.98621	13 0.97050	18 0.99608	25 0.95077	31 0.99109	42 0.94273	37 1.02860			
4	1413.4	583.9	0.0107	9.92	2 1.00266	9 0.97700	14 0.97562	19 0.99060	26 0.97415	32 0.98402	39 0.92775	38 0.94967			
5	1440.7	583.5	0.0106	9.94	1 1.16572	10 0.96721	15 0.98585	20 0.98094	27 0.98987	33 0.97761	40 0.93323	43 0.93725			
6	1444.9	583.9	0.0106	9.96				21 0.97415	28 0.98950						

WIND TUNNEL TEST CONDITIONS..... 0 6.073 PT 18.011 PS 10.586 R/L 5.1 MACH 0.905 TEMP 102.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1421.1 TC= 581.5 PTC/PSA= 134.24 PSM(221)/PSA= 0.9380
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1640. HEATER TOTAL TEMPERATURE= 635.

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FRAME	WIND	PTC	TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TOP	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.54	1705.99	114.5	111.4	112.5	119.7	0.0	576.3	629.3	593.5
2	10.54	1753.04	114.5	111.4	114.7	117.6	0.0	498.2	727.7	597.4
3	10.57	1810.51	114.9	110.1	114.0	111.4	0.0	489.4	752.1	591.3
4	10.56	1830.23	114.9	109.7	113.0	112.7	0.0	443.4	724.0	590.2
5	10.57	1858.09	115.3	110.1	113.0	114.5	0.0	476.4	703.1	590.9
6	10.57	1867.57	112.0	109.7	113.0	116.2	0.0	473.4	655.0	590.2

[illegible]

WIND TUNNEL TEST CONDITIONS.....	6.875	PT	18.007	PS	10.578	R/L	5.1	MACH	0.906	TEMP	102.1	
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.60	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1629.0	TC=	589.8	PTC/PSA=	172.90		PSM[22]/PSA=	0.9741			
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=				2020.	HEATER TOTAL TEMPERATURE=						640.

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MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 19971

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCW
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.60	1800.72	120.1	114.0	114.9	108.4	0.0	557.1	587.8
2	10.60	1811.78	119.7	113.2	114.0	109.3	0.0	548.6	596.5
3	10.61	1831.78	120.1	112.7	114.0	110.1	0.0	541.0	601.3
4	10.63	1829.15	120.1	113.6	114.5	111.9	0.0	533.6	603.0
5	10.63	1850.20	120.5	112.3	114.0	114.0	0.0	526.3	603.0
6	10.62	1849.15	121.0	112.7	113.6	116.2	0.0	519.3	603.9

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1799.7	587.8	0.0106	10.37	5	0.99607	6	0.98332	11	0.95856	16	0.98587	23	0.96220	29	1.01428	34	0.98660	35	1.03504
2	1820.7	596.5	0.0104	10.38	4	0.95273	7	0.97349	12	0.96876	17	1.01537	24	0.96475	30	1.00590	41	0.97895	36	1.02266
3	1831.8	601.3	0.0104	10.39	3	0.88208	8	0.98915	13	0.97313	18	1.00554	25	0.95492	31	1.00336	42	0.98952	37	1.03504
4	1832.3	602.6	0.0105	10.41	2	1.08421	9	0.97786	14	0.97859	19	0.99899	26	0.97932	32	0.99971	39	0.97276	38	0.98587
5	1853.4	603.0	0.0105	10.42	1	1.15887	10	0.96876	15	0.98915	20	1.00008	27	0.99389	33	0.99935	40	0.97823	43	0.98187
6	1854.4	603.9	0.0105	10.42									21	0.99534	28	0.99461				

WIND TUNNEL TEST CONDITIONS..... Q 6.048 PT 18.004 PS 10.621 R/L 5.1 MACH 0.902 TEMP 106.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1832.0 TC= 599.2 PTC/PSA= 172.50 PSM(22)/PSA= 0.9791
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2020. HEATER TOTAL TEMPERATURE= 666.

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SPC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NO-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIST	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.43	1744.41	111.0	104.5	107.1	108.0	0.0	541.3	112.7	574.4
2	7.44	1793.98	110.8	105.5	106.0	110.6	0.0	535.8	774.4	577.4
3	7.45	1809.15	110.6	104.9	106.7	112.7	0.0	527.1	737.4	575.7
4	7.45	1831.72	111.0	105.3	107.1	115.8	0.0	520.2	713.4	573.5
5	7.46	1851.78	110.6	104.9	106.7	117.9	0.0	512.8	686.4	571.2
6	7.46	1853.36	110.6	105.8	107.1	121.0	0.0	505.9	667.5	569.2

[illegible]

MIND TUNNEL TEST CONDITIONS.....	Q	7.476	PT	18.007	PS	7.449	R/L	5.4	MACH	1.198	TEMP	101.9
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS.....	PTC	1826.1	TC	574.1	PTC/PSA	245.13	PSN[22]/PSA= 0.9429					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2010.					HEATER TOTAL TEMPERATURE= 620.						

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PSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 200/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.46	1781.25	131.4	121.8	127.9	122.3	0.0	560.5	583.1
2	7.45	1802.30	130.9	120.5	126.6	123.6	0.0	551.0	585.2
3	7.46	1803.88	130.5	119.7	125.3	124.4	0.0	541.5	583.9
4	7.45	1805.46	130.1	119.7	124.4	126.2	0.0	532.8	583.5
5	7.46	1818.62	130.5	119.2	124.0	128.8	0.0	525.0	582.2
6	7.45	1830.20	130.1	119.7	122.3	130.5	0.0	517.6	582.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1783.9	583.1	0.0105	7.76	5	0.89545	6	0.96860	11	1.00181	16	1.00000	23	1.06406	29	1.09344	34	1.04798	35	1.13047
2	1798.1	585.7	0.0105	7.77	4	0.80051	7	1.06510	12	0.99766	17	1.11024	24	1.04954	30	1.07600	41	1.02930	36	1.09304
3	1808.1	584.6	0.0105	7.78	3	0.94059	8	1.11128	13	1.00077	18	1.10764	25	0.98106	31	1.08430	42	1.04124	37	1.11283
4	1817.0	583.9	0.0105	7.79	2	1.29234	9	1.09104	14	1.00077	19	1.09467	26	1.06251	32	1.08222	39	1.02671	38	1.03346
5	1817.6	582.6	0.0106	7.81	1	1.40655	10	1.03501	15	1.06510	20	1.09519	27	1.07600	33	1.08326	40	1.04124	43	1.03812
6	1837.0	582.2	0.0105	7.81	.								21	1.09000	28	1.08378				

WIND TUNNEL TEST CONDITIONS..... 0 7.474 PT 18.007 PS 7.456 R/L 5.5 MACH 1.197 TEMP 100.7
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1810.3 TC= 583.7 PTC/PSA= 242.81 PSM(22)/PSA= 1.0443
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2010. HEATER TOTAL TEMPERATURE= 64°.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 201/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.42	1430.72	110.1	107.1	112.3	108.8	0.0	564.4	569.2
2	7.41	1447.57	109.7	106.2	111.0	109.7	0.0	553.6	573.5
3	7.42	1434.41	110.1	106.2	110.6	111.9	0.0	544.5	572.7
4	7.42	1451.78	109.7	104.9	109.3	114.0	0.0	535.8	571.8
5	7.42	1446.51	110.1	104.9	109.3	116.6	0.0	528.0	570.5
6	7.42	1464.94	109.7	105.8	108.4	118.4	0.0	520.2	569.2

FR	PTC	Tc P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1428.6	569.6	0.0107	6.79	5	0.87883	6	0.99611	11	0.97735	16	1.00184	23	0.92157	29	1.03103	34	0.92835	35	1.13424
2	1446.0	573.5	0.0105	6.78	4	0.76520	7	0.98516	12	0.96640	17	1.04459	24	1.00341	30	1.00445	41	0.86371	36	0.99246
3	1432.8	573.1	0.0107	6.80	3	0.94920	8	0.98673	13	0.94086	18	1.01123	25	0.93148	31	0.97735	42	0.87257	37	1.02426
4	1456.5	571.8	0.0105	6.78	2	1.28071	9	0.97787	14	1.01331	19	1.00132	26	1.01018	32	0.98412	39	0.86215	38	0.91532
5	1441.8	570.5	0.0107	6.79	1	1.38705	10	0.97630	15	1.00393	20	0.98881	27	1.01435	33	0.98204	40	0.88248	43	0.87205
6	1466.0	570.1	0.0106	6.80																

WIND TUNNEL TEST CONDITIONS..... Q 7.486 PT 18.011 PS 7.421 R/L 5.5 MACH 1.201 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1445.3 TC= 571.4 PTC/PSA= 194.77 PSM(22)/PSA= 0.9150
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1645. HEATER TOTAL TEMPERATURE= 610.

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TEST 575 RUN 202/0

WIND TUNNEL TEST CONDITIONS.....	Q	7.485	PT	18.015	PS	7.431	R/L	5.4	MACH	1.200	TEMP	102.3
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1144.6	TC=	575.3	PTC/PSA=	154.04			PSM122/PSA=	0.9010		
HEATER PARAMETERS.....	HEATER TOTAL	PRESSURE= 1245.				HEATER TOTAL	TEMPERATURE= 630.					

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 203/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.43	772.30	101.4	98.4	99.3	102.3	0.0	550.1	548.4
2	7.45	776.51	101.0	98.8	99.3	104.0	0.0	541.9	558.8
3	7.45	783.36	101.4	97.5	98.8	105.3	0.0	533.2	563.1
4	7.46	790.20	101.4	98.0	98.6	107.1	0.0	525.8	566.2
5	7.44	795.99	101.4	98.6	99.3	109.3	0.0	518.9	568.3
6	7.45	799.67	101.0	96.7	98.0	111.0	0.0	511.5	567.9

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FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	770.2	548.4	0.0108	6.62	5	0.88946	6	0.99434	11	0.97565	16	1.00161	23	0.91594	29	1.03069	34	0.90555	35	1.13609
2	774.9	558.8	0.0108	6.63	4	0.78457	7	0.97773	12	0.96163	17	1.04107	24	1.00005	30	0.99953	41	0.70668	36	0.98759
3	780.2	562.7	0.0108	6.64	3	0.95748	8	0.99590	13	0.94449	18	1.00732	25	0.92632	31	0.97565	42	0.71499	37	1.02498
4	788.1	565.7	0.0107	6.63	2	1.28148	9	0.97617	14	1.01511	19	1.00525	26	1.00732	32	0.98655	39	0.70513	38	0.90815
5	798.6	568.8	0.0107	6.63	1	1.38325	10	0.97773	15	1.00576	20	0.98240	27	1.01148	33	0.98084	40	0.72590	43	0.71655
6	800.2	568.3	0.0107	6.62									21	0.96994	28	1.01926				

WIND TUNNEL TEST CONDITIONS..... 0 7.478 PT 18.011 PS 7.449 R/L 5.4 MACH 1.198 TEMP 102.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 785.4 TC= 562.1 PTC/PSA= 105.43 PSM(22)/PSA= 0.8899
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 840. HEATER TOTAL TEMPERATURE= 620.

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 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 20470

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.47	381.25	100.1	98.0	101.0	102.3	0.0	540.6	508.5
2	7.48	380.20	100.6	97.1	100.1	102.7	0.0	532.3	518.9
3	7.48	385.46	100.1	97.5	100.1	103.6	0.0	525.0	527.6
4	7.46	386.51	99.7	97.1	99.7	104.5	0.0	517.2	532.8
5	7.46	390.20	100.6	96.7	99.7	105.8	0.0	509.8	537.5
6	7.48	392.83	100.6	98.4	100.6	108.0	0.0	504.2	541.0

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	379.1	508.9	0.0106	6.63	5	0.89284	6	0.99636	11	0.98083	16	1.00308	23	0.91095	29	1.02948	34	0.94267	35	1.14387
2	379.1	519.3	0.0196	6.63	4	0.79605	7	0.97151	12	0.96168	17	1.03517	24	0.99946	30	0.99222	41	0.56158	36	0.98652
3	383.4	526.0	0.0105	6.63	3	0.98737	8	0.99843	13	0.94874	18	1.00723	25	0.98648	31	0.97513	42	0.56469	37	1.02638
4	385.5	533.6	0.0106	6.63	2	1.27948	9	0.97513	14	1.01499	19	1.00412	26	1.00619	32	0.98445	39	0.55848	38	0.90888
5	389.1	537.5	0.0105	6.60	1	1.37523	10	0.97462	15	1.00464	20	0.97979	27	1.01033	33	0.97721	40	0.57433	43	0.56779
6	392.3	541.5	0.0105	6.63																

WIND TUNNEL TEST CONDITIONS..... 0 7.471 PT 18.011 PS 7.473 R/L 5.4 MACH 1.195 TEMP 102.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 384.8 TC= 528.2 PTC/PSA= 51.49 PSM(22)/PSA= 0.8864
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 440. HEATER TOTAL TEMPERATURE= 600.

TEST 575 RUN 20471

WIND TUNNEL TEST CONDITIONS..... Q													7.492	PT	18.009	PS	7.393	R/L	5.5	MACH	1.203	TEMP	101.3
MODEL ATTITUDE..... ALPHA													0.00	BETA	0.00	POLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC=													389.3	TC=	524.0	PTC/PSA=	52.66	PSM1221/PSA= 0.9627					
HEATER PARAMETERS..... HEATER TOTAL PRESSURE=													445.	HEATER TOTAL TEMPERATURE= 630.									

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 20570

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.35	336.05	79.3	82.4	82.4	85.8	0.0	548.0	883.0	508.5
2	5.38	334.99	80.2	81.1	82.8	86.7	0.0	541.0	867.4	518.9
3	5.38	338.15	80.6	83.2	84.1	87.6	0.0	534.1	854.0	526.7
4	5.38	336.05	81.9	81.9	84.1	88.4	0.0	526.3	840.1	531.5
5	5.38	340.78	81.5	83.7	84.5	89.7	0.0	520.6	827.6	537.5
6	5.35	344.47	81.9	82.8	85.4	90.6	0.0	513.7	814.0	540.6

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	334.5	508.9	0.0108	5.04	5 0.85248	6 0.87480	11 0.95039	16 0.88271	23 0.92231	29 0.89855	34 0.93383	35 0.93239			
2	332.9	518.9	0.0108	5.03	4 0.75744	7 0.93527	12 0.91943	17 0.90431	24 0.96695	30 0.94247	41 0.57888	36 1.10231			
3	334.5	526.3	0.0108	5.03	3 0.97775	8 0.94823	13 0.91871	18 0.91223	25 0.90431	31 0.98783	42 0.58392	37 1.02599			
4	334.5	531.0	0.0108	5.03	2 1.29599	9 0.96479	14 0.93311	19 0.93959	26 0.89135	32 0.97847	39 0.57600	38 1.01735			
5	340.8	538.0	0.0108	5.02	1 1.39607	10 0.96047	15 0.93311	20 0.93095	27 0.90791	33 0.96767	40 0.58464	43 0.57888			
6	342.9	540.6	0.0108	5.02				21 0.97775	25 0.90431						

WIND TUNNEL TEST CONDITIONS..... Q 7.761 PT 18.011 PS 5.372 R/L 5.3 MACH 1.437 TEMP 103.4
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 336.7 TC= 527.3 PTC/PSA= 62.67 PSM(22)/PSA= 0.9358
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 38% HEATER TOTAL TEMPERATURE= 83°

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HSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 205/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	5.02	387.57	103.2	99.3	103.6	101.0	0.0	548.8	502.9
2	5.06	384.41	103.2	99.7	103.6	101.0	0.0	541.5	517.6
3	5.02	387.57	104.0	100.6	103.6	101.0	0.0	533.6	527.1
4	5.09	389.15	103.6	99.0	102.3	101.0	0.0	525.8	533.6
5	5.12	392.83	103.2	99.3	102.3	101.0	0.0	520.2	539.7
6	5.12	393.88	103.2	98.8	102.3	102.3	0.0	512.6	544.9

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	387.0	502.9	0.0106	5.20	5	0.91391	6	0.90247	11	0.95659	16	0.96574	23	0.92610	29	0.97717	34	1.02671	35	0.93677
2	383.9	518.0	0.0106	5.22	4	0.79805	7	0.99546	12	0.94821	17	0.99013	24	0.95430	30	1.07702	41	0.68676	36	1.19136
3	387.0	527.6	0.0106	5.22	3	0.99699	8	0.98022	13	0.89714	18	0.98251	25	0.93982	31	1.10141	42	0.69591	37	1.07778
4	387.0	533.6	0.0107	5.24	1	1.37276	9	1.00156	14	0.96040	19	1.03815	26	0.91391	32	1.03922	39	0.67381	38	1.16696
5	392.8	540.6	0.0106	5.27	1	1.47948	10	0.98555	15	0.99927	20	1.08312	27	0.97031	33	1.10141	40	0.69515	43	0.69591
6	391.8	544.9	0.0106	5.30																

WIND TUNNEL TEST CONDITIONS..... Q 7.740 PT 18.004 PS 5.075 R/L 5.2 MACH 1.476 TEMP 106.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 388.3 TC= 527.9 PTC/PSA= 76.51 PSM(22)/PSA= 1.0332
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 430. HEATER TOTAL TEMPERATURE= 620.

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10 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 206/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.13	748.09	94.5	91.5	92.8	94.1	0.0	496.8	859.2	539.3
2	5.09	746.51	94.5	91.5	93.2	94.9	0.0	492.0	833.6	550.1
3	5.12	745.46	94.5	92.8	94.1	96.2	0.0	487.3	812.0	557.1
4	5.13	754.93	94.5	91.9	94.1	97.1	0.0	492.1	791.1	561.0
5	5.12	762.30	94.5	92.8	94.1	98.4	0.0	478.2	772.9	565.3
6	5.12	762.30	94.5	93.2	94.5	100.1	0.0	474.3	756.9	567.0

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	747.0	539.3	0.0108	4.97	5	0.88471	6	0.90058	11	0.99200	16	0.91720	23	0.96178	29	0.92854	34	0.96933	35	0.96631
2	746.5	550.1	0.0108	4.94	4	0.77441	7	0.97009	12	0.95196	17	0.92854	24	0.97613	30	0.96480	41	0.76081	36	1.14990
3	745.5	556.6	0.0108	4.94	3	0.98595	8	0.98142	13	0.94365	18	0.93987	25	0.93685	31	1.00484	42	0.77290	37	1.05848
4	754.4	560.5	0.0108	4.95	2	1.33198	9	1.00182	14	0.95649	19	0.95196	26	0.91871	32	1.02071	39	0.75411	38	1.04640
5	761.0	565.3	0.0107	4.96	1	1.43851	10	0.99427	15	0.97764	20	0.95404	27	0.93307	33	0.99124	40	0.77592	43	0.76232
6	763.9	560.6	0.0108	4.95																

WIND TUNNEL TEST CONDITIONS..... 0 7.747 PT 18.013 PS 5.120 R/L 5.3 MACH 1.471 TEMP 104.2
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 753.2 TC= 556.4 PTC/PSA= 147.12 PSM(22)/PSA= 0.9672
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 650, HEATER TOTAL TEMPERATURE= 64F.

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10 AUGUST 1973

MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 20770

ORIGINAL FILE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.33	1062.36	103.2	98.4	103.2	100.6	0.0	476.4	900.8	576.6
2	5.32	1062.36	103.6	98.4	103.2	101.4	0.0	474.3	864.8	583.9
3	5.30	1068.68	104.0	99.3	103.2	102.3	0.0	473.0	834.1	586.1
4	5.30	1081.31	104.0	98.8	102.7	103.6	0.0	469.9	805.0	568.3
5	5.27	1080.78	104.0	98.4	103.2	104.9	0.0	468.2	779.9	587.4
6	5.31	1091.84	103.6	99.3	102.7	107.1	0.0	466.0	758.2	588.3

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FR	PTC	TC P47/PTC	PORT-22 NO	PSH/PSA NO	PS /PSA NO	PSM/PSA NO	PSH/PSA NO	PS /PSA NO	PSM/PSA NO	PSH/PSA NO	PS /PSA NO	PSM/PSA NO	PSH/PSA NO	PS /PSA NO	PSM/PSA NO				
1	1061.8	577.4 0.0108	5.02	5	0.86438	6	0.86146	11	0.95621	16	0.90155	23	0.92341	29	0.90446	34	0.93799	35	0.93872
2	1063.9	583.5 0.0108	5.01	4	0.76307	7	0.94528	12	0.93216	17	0.90228	24	0.94746	30	0.93945	41	0.83012	36	1.11874
3	1069.2	586.5 0.0108	5.01	3	0.95475	8	0.95767	13	0.91685	18	0.91248	25	0.91685	31	0.97079	42	0.84543	37	1.03055
4	1081.3	567.8 0.0108	4.96	2	1.28709	9	0.97443	14	0.91831	19	0.91831	26	0.89790	32	0.99702	39	0.81992	38	1.01670
5	1081.6	587.8 0.0108	4.95	1	1.37163	10	0.96423	15	0.95912	20	0.94309	27	0.90811	33	0.97151	40	0.84470	43	0.82648
6	1092.4	586.7 0.0108	5.00										21	0.97079	28	0.91758			

WIND TUNNEL TEST CONDITIONS..... Q 7.758 PT 18.011 PS 5.307 R/L 5.3 MACH 1.445 TEMP 102.5
 MODEL ATTITUDE..... ALPHA -0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1075.1 TC= 585.3 PTC/PSA= 202.57 PSM(22)/PSA= 0.9405
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1220. HEATER TOTAL TEMPERATURE= 640.

TEST 575 RUN 208/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING	FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.21	1453.94	93.2	91.0	93.6	93.2	0.0	541.5	838.4	580.5
2	5.24	1482.36	94.5	93.6	95.4	95.4	0.0	534.5	801.6	586.1
3	5.23	1503.94	94.1	92.8	94.5	96.7	0.0	527.1	770.8	587.8
4	5.24	1497.10	94.1	92.8	94.9	98.4	0.0	521.9	746.1	589.1
5	5.24	1498.15	94.1	93.6	95.4	100.6	0.0	515.9	724.0	589.1
6	5.23	1529.20	94.1	94.9	95.4	102.7	0.0	510.2	706.6	589.1

[illegible]

WIND TUNNEL TEST CONDITIONS..... C										7.754	PT	18.009	PS	5.233	R/L	5.3	MACH	1.455	TEMP	103.6	
MODEL ATTITUDE.....										ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..										PTC=	1492.7	TC=	587.0	PTC/PSA=	285.23	PSM(22)/PSA= 0.9441					
HEATER PARAMETERS.....										HEATER TOTAL PRESSURE=				1645.	HEATER TOTAL TEMPERATURE=					650.	

7-57 272 408 209/3

FRAME	PSA	RTG	TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TGM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.22	1345.44	137.7	134.8	145.2	126.4	0.0	574.4	779.4	592.6
2	5.22	1631.64	136.6	133.1	143.1	126.2	0.0	564.9	746.5	597.9
3	5.23	1521.26	136.1	131.4	141.9	126.6	0.0	556.2	726.5	596.9
4	5.22	1658.15	135.3	130.1	139.6	127.5	0.0	547.5	700.5	597.6
5	5.21	1599.26	134.6	129.6	138.7	129.2	0.0	540.6	685.6	598.2
6	5.24	1699.20	134.0	127.9	137.0	130.5	0.0	533.2	673.7	597.8

[illegible]

WIND TUNNEL TEST CONDITIONS.....		Q	7.753	PT	18.009	PS	5.225	R/L	5.3	MACH	1.456	TEMP	103.0
MODEL ATTITUDE.....		ALPHA	-0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..		PTC=	1863.3	TC=	597.2	PTC/PSA=	356.64	PSN(22)/PSA=		0.9655			
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE=					2070.						
							HEATER TOTAL TEMPERATURE=						
							658.						

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TEST 575 RU 209/1

WIND TUNNEL TEST CONDITIONS.....													3	7.746	PT	18.009	PS	5.131	R/L	5.2	MACH	1.469	TEMP	106.7										
MODEL ATTITUDE.....													ALPHA		-0.72	BETA		0.06	ROLL		0.0													
AVERAGE NOEL/NOZZLE PARAMETERS..													MTC=		1622.0	TC=		596.6	PTC/PSA=		355.11	PSX[221]/PSA= 1.0906												
HEATER PARAMETERS.....													HEATED TOTAL PRESSURE=										1990.	HEATER TOTAL TEMPERATURES=										650.

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SEE THIS VIDEO AT THE AUTOVILLE, ALABAMA
FLUORE TECHNOLOGY TEST...FLUORESCENT PHASE



IS IT
PAGE
QUALITY
OR POOR

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16 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NOV-QUIESCENT PHASE

TES: 575 RUN 21.0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING	FEEDER-PIPE	TCH
			SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]			
1	1.22	782.32	105.8	104.0	115.3	118.8	0.0	552.7	765.1	552.7
2	1.21	789.16	105.3	104.0	114.5	117.5	0.0	553.2	745.2	561.0
3	1.22	780.22	105.3	103.2	113.6	117.5	0.0	551.4	726.6	565.3
4	1.22	801.27	105.8	101.4	111.9	117.5	0.0	550.1	710.1	566.2
5	1.21	801.80	105.8	101.9	111.4	118.4	0.0	548.0	694.0	566.6
6	1.22	808.64	105.3	100.6	111.0	117.9	0.0	547.5	682.3	567.9

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	780.2	551.9	0.0109	1.17	5	0.83587	6	0.86643	11	0.94728	16	0.97720	23	0.94601	29	0.92627	34	0.92500	35	0.72319	
2	787.6	561.0	0.0108	1.17	4	0.78622	7	0.88553	12	0.99248	17	0.99121	24	0.97529	30	0.94028	41	0.72574	36	0.89763	
3	790.7	565.7	0.0108	1.17	3	1.47567	8	0.91991	13	0.99375	18	0.99630	25	0.98930	31	0.93964	42	0.74993	37	0.94155	
4	803.9	565.7	0.0107	1.17	2	2.56938	9	0.98357	14	0.96447	19	1.02113	26	0.98357	32	0.93328	39	0.72510	38	0.98675	
5	801.8	567.5	0.0108	1.17	1	2.68588	10	0.97338	15	1.00203	20	0.99821	27	1.00139	33	0.93646	40	0.74367	43	0.74038	
6	806.0	567.5	0.0108	1.17									21	0.98994	28	0.97975					

WIND TUNNEL TEST CONDITIONS..... 0 10.297 PT 90.086 PS 1.215 R/L 10.7 MACH 3.480 TEMP 101.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 795.0 TC= 563.2 PTC/PSA= 654.26 PSM[22]/PSA= 0.9639
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 860. HEATER TOTAL TEMPERATURE= 620.

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TEST 575 RUN 212/0

WIND TUNNEL TEST CONDITIONS..... Q 10.292 PT 90.040 PS 1.215 R/L 10.7 MACH 3.480 TEMP 101.0									
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1186.4 TC= 564.9 PTC/PSA= 976.85 PS4(22)/PSA= 0.9767									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1310. HEATER TOTAL TEMPERATURE= 625.									

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 573 RUN 212/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	1163.90	127.5	120.1	128.3	127.9	0.0	584.8	563.6
2	1.21	1157.06	127.5	117.9	125.7	127.5	0.0	582.6	569.2
3	1.21	1171.27	127.5	116.6	125.7	126.6	0.0	582.2	573.5
4	1.21	1167.06	126.6	116.6	124.9	127.0	0.0	577.9	571.8
5	1.22	1191.80	125.7	115.8	122.7	127.0	0.0	574.8	571.8
6	1.22	1180.22	126.6	117.1	123.6	127.9	0.0	571.4	570.9

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1169.2	563.1	0.0108	1.18	5	0.84120	6	0.86795	11	0.95137	16	0.98130	23	0.94818	29	0.92653	34	0.92844	35	0.72339
2	1158.6	569.2	0.0108	1.18	4	0.79089	7	0.88578	12	0.99467	17	1.00613	24	0.97747	30	0.94245	41	0.82783	36	0.90233
3	1169.2	573.5	0.0107	1.18	3	1.48436	8	0.92526	13	0.99785	18	1.00231	25	0.99085	31	0.94181	42	0.86413	37	0.94755
4	1168.1	572.2	0.0108	1.18	2	2.56499	9	0.98703	14	0.96983	19	1.03351	26	0.98575	32	0.93606	39	0.82783	38	0.99148
5	1191.2	571.8	0.0107	1.18	1	2.69936	10	0.97875	15	1.00740	20	1.00422	27	1.00295	33	0.93927	40	0.89533	43	0.84120
6	1180.2	571.8	0.0109	1.18									21	0.99721	28	0.98257				

WIND TUNNEL TEST CONDITIONS..... Q 10.295 PT 90.061 PS 1.215 R/L 10.7 MACH 3.480 TEMP 101.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1172.6 TC= 570.3 PTC/PSA= 969.43 PSM(22)/PSA= 0.9667
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1310. HEATER TOTAL TEMPERATURE= 625.

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PRA F	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEET-P-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1150.11	286.2	291.9	312.9	331.3	0.0	465.2	719.6	590.0
2	1.21	1145.95	287.7	284.4	307.4	324.7	0.0	470.4	701.1	591.7
3	1.22	1150.22	286.3	280.5	301.7	320.4	0.0	475.1	687.1	592.2
4	1.22	1159.16	285.7	277.0	298.3	315.0	0.0	479.0	675.6	590.0
5	1.22	1175.38	283.5	272.7	293.9	312.1	0.0	482.1	655.0	589.1
6	1.21	1177.59	281.6	268.8	290.0	307.8	0.0	486.8	658.1	589.6

FR	FTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1158.6	589.1	0.0108	1.16	5	0.83796	6	0.86982	11	0.97106	16	0.98698	23	0.94686	29	0.93222	34	0.92394	35	0.70171
2	1145.5	592.2	0.1109	1.16	4	0.78513	7	0.88446	12	0.99590	17	1.02646	24	0.97998	30	0.94368	41	0.87364	36	0.88828
3	1150.7	592.2	0.0109	1.16	3	1.46328	8	0.94368	13	1.00163	18	0.99653	25	0.99781	31	0.94241	42	0.90356	37	0.94050
4	1159.2	590.0	0.0109	1.16	2	2.54577	9	0.98889	14	0.98380	19	1.00035	26	0.99144	32	0.93540	39	0.86918	38	0.99398
5	1175.0	589.1	0.0108	1.16	1	2.66803	10	0.98380	15	1.00545	20	0.99717	27	0.99462	33	0.93540	40	0.92394	43	0.87555
6	1178.6	589.6	0.0108	1.16									21	0.99271	28	0.97616				

WIND TUNNEL TEST CONDITIONS..... Q 10.295 PT 90.065 PS 1.215 R/L 10.6 MACH 3.480 TEMP 102.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1161.3 TC= 590.4 PTC/PSA= 955.86 PSM(22)/PSA= 0.9540
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 625.

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16 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TESTS..NON- JESCEPT PHASET ST 575 RUN 213/0
E

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	TEMP ATU E DATA	DEG EES FAN ENHET	MODEL-STING FEEDER-PIPE	TCH		
1	1.21	1509.09	95.3	97.1	105.8	95.6	0.0	593.0	725.3	556.2
2	1.1	1494.95	99.3	98.0	105.8	96.7	0.0	589.6	697.5	560.5
3	1.21	1523.38	99.7	97.1	104.9	97.5	0.0	584.8	674.5	560.5
4	1.21	1519.17	99.3	95.4	102.7	98.4	0.0	579.6	654.6	559.7
5	1.21	1540.22	99.3	95.8	104.0	99.3	0.0	576.1	640.3	561.4
6	1.21	1552.32	99.7	95.4	102.7	101.4	0.0	571.4	629.9	560.5

FR	PTC	IC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	1508.6	556.2	0.0106	1.19	5	0.84470	6	0.86508	11	0.94344	16	0.97401	23	0.94598	29	0.92305	34	0.92942	35	0.72303
2	1495.5	561.0	0.0107	1.19	4	0.79565	7	0.88419	12	0.99121	17	0.99504	24	0.97975	30	0.94089	41	0.89884	36	0.89884
3	1513.4	561.0	0.0106	1.19	3	1.49383	8	0.92050	13	0.99504	18	0.99695	25	0.99185	31	0.94216	42	0.94344	37	0.94726
4	1522.3	559.7	0.0107	1.19	2	2.59588	9	0.98484	14	0.96382	19	1.02689	26	0.98612	32	0.93452	39	0.91695	38	0.99312
5	1538.0	561.0	0.0106	1.19	1	2.68507	10	0.9765	15	1.00395	20	0.99758	27	1.00395	33	0.93770	40	0.97338	3	0.9090
6	1548.1	560.1	0.0106	1.19																

WIN TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.027 PS 1.214 R/L 10.6 MACH 3.485 TEMP 101.5
 MODDL ATTITUDE.....0..... ALPHA 0.70 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NO LE PARAMETERS.. PTC= 1521.1 TC= 559.9 PTC/PSA= 1252.56 PSM(22)/PSA= 0.9786
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1700. HEATER TOTAL TEMPERATURE= 620.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 21472

FRAC	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TC-	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1794.95	85.0	82.8	86.7	85.4	0.0	557.1	736.1	556.6
2	1.21	1817.06	85.0	80.6	85.8	85.0	0.0	557.1	701.4	561.0
3	1.21	1899.17	85.4	80.6	85.4	85.4	0.0	554.9	674.5	561.4
4	1.21	1834.43	85.4	82.4	85.8	87.6	0.0	550.1	652.0	555.4
5	1.21	1844.95	85.8	81.1	85.4	88.9	0.0	547.5	636.4	557.9
6	1.21	1861.60	86.7	82.8	86.0	91.5	0.0	546.2	626.0	558.6

3

FR	PTC	TC P47/PTC	P RT-22 N	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA	PSM/PSA
1	1797.6	557.1	0.0105	1.20	0.84657	0.86632	0.94467	0.97970	0.94722	0.92683	0.93639	0.72673			
2	1801.7	561.0	0.0104	1.20	0.7752	0.88861	0.6017	1.0000	0.8161	0.433	0.5231	0.0708			
3	1812.0	561.0	0.0105	1.20	1.49567	0.92110	1.00072	1.00263	0.99499	0.94530	1.00263	0.95295			
4	1830.7	557.2	0.0105	1.20	2.60723	0.98989	0.96951	1.03136	0.99053	0.93830	0.96695	0.99499			
5	1846.5	557.9	0.0105	1.20	2.71297	0.97715	1.01120	1.00327	1.00837	0.94021	1.03512	0.96696			
6	1860.7	558.8	0.0104	1.20											

21 0.99563 28 0.99053

WIND TUNNEL TEST CONDITIONS..... 0 10.291 PT 90.031 PS 1.214 R/L 10.6 MACH 3.480 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PT = 1828.0 T = 559.2 PT /PSA = 1505.23 PSM(22)/PSA = 0.9847
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE = 2025. HEATER TOTAL TEMPERATURE = 630.

A-113

08 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 215/0

FRAM#	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.58	10.25	92.3	94.5	96.2	95.6	0.0	271.8	533.6	108.4
2	10.59	10.25	91.5	94.1	95.4	94.9	0.0	264.0	532.8	107.5
3	10.58	10.25	91.9	94.1	94.9	94.5	0.0	256.2	532.3	107.5
4	10.59	10.25	92.8	94.5	97.3	94.9	0.0	247.5	531.9	106.2
5	10.57	10.25	92.8	92.8	94.1	94.1	0.0	241.0	531.0	105.8
6	10.58	10.25	92.3	92.3	94.1	94.1	0.0	234.5	531.0	105.8

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	9.7	109.7	0.9884	9.98	5	0.99706	6	0.98390	11	0.96198	16	0.97733	23	0.96381	29	1.00729	34	0.93385	35	1.03761
2	10.3	109.3	0.9396	10.02	4	0.05285	7	0.97513	12	0.96892	17	1.01642	24	0.96564	30	0.99523	41	0.91412	36	1.02117
3	10.8	104.3	0.8918	10.00	3	0.88087	8	0.98756	13	0.97331	18	0.99340	25	0.95469	31	0.98756	42	0.89731	37	1.02150
4	10.3	108.0	0.9357	10.01	2	1.08036	9	0.97660	14	0.97660	19	0.98902	26	0.97842	32	0.97842	39	0.94043	38	0.92106
5	10.3	107.5	0.9386	9.98	1	1.15051	10	0.96637	15	0.98390	20	0.98135	27	0.98646	33	0.96600	40	0.91047	43	0.90133
6	10.3	107.1	0.9376	9.98																

WIND TUNNEL TEST CONDITIONS..... Q 6.063 PT 17.996 PS 10.587 R/L 5.1 MACH 0.905 TEMP 100.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NO 2274 PARAMETERS.. PTC= 10.3 TC= 108.5 PTC/PSA= 0.97 PSM(22)/PSA= 0.9441
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

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TEST 575 RUN 215/1

WIND TUNNEL TEST CONDITIONS.....		Q = 6.035	PT = 18.011	PS = 10.651	R/L = 5.1	MACH = 0.880	TEMP = 100.2
MODEL ATTITUDE.....		ALPHA = 0.00	BETA = 0.00	ROLL = 0.0			
AVERAGE MODEL/NOZZLE PARAMETERS..		PTC = 10.3	TC = 141.3	PTC/PSA = 0.97	PSM(22)/PSA = 0.9426		
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE = 0.		HEATER TOTAL TEMPERATURE = 75.			

A-115

TEST 575 RUN 21610

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WIND TUNNEL TEST CONDITIONS..... Q 7.476 PT 17.996 PS 7.428 #/L 5.5 MACH 1.199 TEMP 100.3
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 6.7 TC= 104.4 PTC/PSA= 0.90 PSW[22]/PSA= 0.0013
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.
  
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A-116

08 AUGUST 1973

PSEC TRISONIC WIND TUNNEL - HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST... ON-QUIESCENT PHASE

TEST 575 RUN 216/1

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	REL	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TC	
1	7.34	7.10	104.5	101.4	103.0	101.4	0.0	140.9	492.0	127.0
2	7.37	7.10	104.9	101.0	103.2	101.4	0.0	140.0	492.9	126.2
3	7.37	7.10	104.5	100.1	101.9	100.6	0.0	136.7	492.0	126.6
4	7.34	7.10	104.0	99.7	101.9	100.1	0.0	137.9	492.0	125.7
5	7.33	7.10	104.5	98.0	101.0	100.1	0.0	137.0	491.6	125.7
6	7.35	7.10	104.5	98.0	100.6	99.7	0.0	135.7	491.2	124.9

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	7.1	129.2 0.9420	7.27	5 0.90194	6 0.98403	11 1.02981	15 1.09558	23 1.07674	29 1.10759	34 1.00718	35 1.17188				
2	7.1	127.5 0.9448	7.28	4 0.81143	7 1.07190	12 1.01560	17 1.12558	24 1.08453	30 1.09346	41 0.91721	36 1.11347				
3	6.0	127.9 1.1311	7.27	3 0.95824	6 1.12716	13 1.03244	18 1.12084	25 1.01139	31 1.09821	42 0.81248	37 1.13505				
4	7.1	127.5 0.9350	7.27	2 1.30712	9 1.11505	14 1.00507	19 1.11190	26 1.06717	32 1.08506	39 0.81669	38 1.00560				
5	6.0	126.6 1.0994	7.26	1 1.43499	10 1.07927	15 1.04559	20 1.09874	27 1.08243	33 1.08243	40 0.81300	43 0.86931				
6	7.1	126.2 0.9406	7.27												

WIND TUNNEL TEST CONDITIONS..... 0 7.504 PT 18.013 PS 7.351 R/L 5.5 MACH 1.280 TEMP 101.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 6.7 TC= 127.5 PTC/PSA= 0.92 PSM(22)/PSA= 0.9891
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= . HEATER TOTAL TEMPERATURE= 75.

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TEST 575 RUN 217/1

WIND TUNNEL TEST CONDITIONS.....	0	7.751	PT	18.004	PS	5.216	R/L	5.3	MACH	1.457	TEMP	106.1
MODEL ATTITUDE.....	ALPHA		-0.62		BETA		0.60		ROLL		0.0	
AVERAGE MODEL/CZ7LE PARAMETERS..	PTC=		4.7		TC=		291.7		PTC/PSA=		0.90	
									PSM(22)/PSA=		1.0162	
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=						1990.					
							HEATER TOTAL TEMPERATURE=					
							650.					

A-118

TEST 575 218/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					SKIN(5) MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)				
1	1.21	15.48	78.5	76.7	78.0	81.5	0.0	180.3	643.5	272.2
2	1.21	15.48	78.0	76.7	78.0	81.5	0.0	181.2	642.5	273.1
3	1.21	15.48	78.0	76.7	78.0	81.5	0.0	180.6	640.7	274.0
4	1.22	15.48	78.9	76.7	77.6	80.2	0.0	179.5	639.0	273.5
5	1.21	15.48	78.0	75.9	77.6	80.2	0.0	179.0	637.3	274.0
6	1.22	15.48	78.9	75.4	76.7	79.8	0.0	184.7	636.5	275.7

FR	PTC	IC	P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	15.0	272.2	0.0172	1.92	5 0.82734	6 0.86620	11 0.94772	16 0.97574	23 0.94199	29 0.92670	34 0.92734	35 3.71334	
2	15.5	273.5	0.0173	1.18	4 0.77193	7 0.88976	12 0.99485	17 0.94581	24 0.97383	30 0.94454	41 0.22101	30 0.90186	
3	14.4	274.0	0.0179	1.18	3 1.44642	8 0.92288	13 0.99485	18 0.99294	25 0.98976	31 0.94135	42 0.18025	37 0.93944	
4	14.4	274.4	0.0179	1.18	2 2.50624	9 0.99039	14 0.98619	19 0.99485	26 0.97893	32 0.93626	39 0.18152	38 0.96646	
5	15.0	275.3	0.0179	1.18	1 2.62852	10 0.77638	15 1.00122	20 0.99740	27 0.99167	33 0.93817	40 0.17706	43 0.20954	
6	15.0	275.3	0.0166	1.18				21 0.99294	28 0.97320				

WIND TUNNEL TEST CONDITIONS.....		Q	10.293	PT	90.044	PS	1.215	R/L	10.7	MACH	3.480	TEMP	100.3
MODEL ATTITUDE.....		ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS...		PTC=	14.9	TC=	274.1	PTC/PSA=	12.24	PSM(22)/PSA= 1.0702					
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE= 1300.					HEATER TOTAL TEMPERATURE= 62°.						

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02 AUGUST 1973

 NRC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 219/8

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM	
1	0.53	191.85	86.6	88.8	90.2	89.3	94.1	107.0	108.3	107.6
2	0.56	192.91	86.6	87.5	89.7	89.3	96.3	105.2	105.2	107.6
3	0.58	193.96	87.1	89.3	90.6	90.2	98.5	104.3	103.9	108.9
4	0.60	193.81	86.6	88.4	90.2	91.0	100.7	103.4	102.1	108.9
5	0.62	194.06	86.6	89.3	90.2	91.9	103.8	103.0	101.2	109.8

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	190.28	188.70	108.0	0.01727	0.01059	0.01122	0.01188	0.01275	0.07613
2	191.33	190.28	108.0	0.01728	0.01059	0.01127	0.01137	0.01270	0.07576
3	191.85	190.00	108.9	0.01733	0.01061	0.01129	0.01150	0.01275	0.07556
✓ 4	193.96	191.85	109.4	0.01738	0.01060	0.01122	0.01137	0.01271	0.07474
5	193.61	193.43	109.8	0.01721	0.01054	0.01121	0.01131	0.01269	0.07428

TUNNEL STATIC PRESSURE= 0.579 HEATER TOTAL PRESSURE= 200. HEATER TOTAL TEMPERATURE= 200. ALPHA= 0.00

62 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 220/0

FRANF	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TC	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.59	372.38	80.9	86.2	86.2	87.1	121.8	295.2	265.7	252.5
2	0.62	371.85	81.4	87.1	86.6	88.8	127.6	291.7	263.1	252.1
3	0.64	375.54	81.4	88.4	87.5	91.9	133.7	289.5	263.1	252.5
4	0.67	374.49	82.2	91.8	88.4	94.6	140.3	286.8	262.6	253.4
5	0.68	375.54	83.6	91.9	89.3	97.6	144.3	284.2	261.3	252.5

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	370.80	368.70	252.5	0.01741	0.01832	0.01869	0.01891	0.01242	0.03989
2	370.80	368.17	252.5	0.01749	0.01834	0.01875	0.01896	0.01250	0.03989
3	373.96	371.33	252.5	0.01742	0.01831	0.01871	0.01898	0.01242	0.03876
4	373.43	370.88	253.8	0.01753	0.01838	0.01878	0.01894	0.01249	0.03884
5	376.86	373.43	253.0	0.01743	0.01831	0.01870	0.01892	0.01243	0.03855

TUNNEL STATIC PRESSURE= 0.642 HEATER TOTAL PRESSURE= 400. HEATER TOTAL TEMPERATURE= 250. ALPHA= -0.82

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02 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 975 RUN 221/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.50	597.64	132.0	137.7	146.9	150.0	155.7	370.0	311.5	279.4
2	0.50	575.54	132.0	138.0	147.4	150.4	162.3	361.0	305.0	279.0
3	0.50	559.22	132.0	139.0	146.5	150.4	160.9	354.0	300.0	279.8
4	0.60	545.54	132.0	130.1	146.9	152.0	173.0	346.7	294.0	278.5
5	0.62	543.43	132.0	140.0	147.4	153.1	180.0	341.4	292.1	278.5

FRAME	PTC	PTC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
2	575.01	571.05	279.0	0.01707	0.01025	0.01001	0.01112	0.01257	0.02521
3	535.17	535.01	279.0	0.01702	0.01026	0.01000	0.01110	0.01255	0.02597
4	546.06	542.30	279.4	0.01776	0.01025	0.01078	0.01113	0.01256	0.02656
5	542.91	530.17	278.9	0.01777	0.01023	0.01079	0.01110	0.01254	0.02672

TUNNEL STATIC PRESSURE= 0.564

HEATER TOTAL PRESSURE= 600.

HEATER TOTAL TEMPERATURE= 300.

ALPHA= -0.02

A-122

02 AUGUST 1973

MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 252/

FRAME	TEMPERATURE DATA--DEGREES FAHRENHEIT--									
	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1	0.37	792.91	92.4	97.2	110.0	128.6	138.1	370.4	403.9	343.4
2	0.39	790.80	92.8	97.2	110.0	128.9	150.0	369.6	389.8	345.7
3	0.41	808.70	91.9	98.1	110.0	129.8	162.3	367.8	378.8	348.0
4	0.44	811.33	92.4	100.7	110.8	132.0	176.0	366.5	372.2	345.4
5	0.46	821.85	92.8	102.5	112.2	135.0	188.3	365.2	367.8	347.6

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	794.49	788.17	345.4	0.01762	0.00998	0.01055	0.01086	0.01225	0.01826
2	790.28	786.59	346.7	0.01789	0.01813	0.01071	0.01103	0.01245	0.01834
3	807.64	801.33	347.6	0.01766	0.01006	0.01058	0.01086	0.01229	0.01795
4	810.80	805.54	348.9	0.01778	0.01807	0.01069	0.01096	0.01240	0.01789
5	822.38	816.59	347.6	0.01765	0.01088	0.01060	0.01089	0.01231	0.01763

TUNNEL STATIC PRESSURE= 0.413 HEATER TOTAL PRESSURE= 800. HEATER TOTAL TEMPERATURE= 350. ALPHA= -0.02

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02 AUGUST 1973

 MSFC TRIBONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 223/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1	0.37	994.49	115.2	122.7	134.6	148.7	167.6	439.5	435.6	390.7
2	0.40	997.12	114.8	121.8	133.7	150.4	183.9	435.6	423.2	390.7
3	0.44	1012.91	114.8	124.0	134.6	152.2	198.8	438.3	415.3	391.6
4	0.46	1013.96	114.8	125.4	135.8	154.8	215.1	427.2	412.7	391.6
5	0.50	999.75	115.2	126.7	135.5	157.9	228.3	422.8	408.7	391.7

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	991.85	987.12	390.7	0.01772	0.00998	0.01051	0.01083	0.01225	0.01462
2	997.64	992.91	390.7	0.01821	0.00997	0.01068	0.01089	0.01233	0.01455
3	1013.96	1010.80	392.0	0.01810	0.00993	0.01054	0.01086	0.01227	0.01431
4	1014.49	1009.22	392.0	0.01816	0.00995	0.01055	0.01085	0.01228	0.01431
5	996.59	990.28	389.8	0.01887	0.00989	0.01058	0.01078	0.01222	0.01457

TUNNEL STATIC PRESSURE= 0.435

HEATER TOTAL PRESSURE= 1000.

HEATER TOTAL TEMPERATURE= 480.

ALPHA= -0.02

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02 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 22470

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TC
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	0.32	1241.33	117.4	123.2	134.2	146.5	170.7	449.6	437.3
2	0.35	1257.64	117.4	124.5	134.6	148.2	192.7	450.5	430.5
3	0.37	1262.91	117.4	125.8	135.5	152.2	213.8	450.5	442.6
4	0.40	1281.33	117.9	128.0	135.9	155.7	234.5	450.5	444.4
5	0.42	1301.33	118.3	131.5	137.2	159.7	253.8	451.0	447.0

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1241.33	1234.49	436.9	0.01806	0.00989	0.01043	0.01074	0.01219	0.01169
2	1260.28	1252.38	439.1	0.01798	0.00981	0.01038	0.01075	0.01212	0.01151
3	1261.85	1254.49	442.2	0.01619	0.01081	0.01090	0.01085	0.01226	0.01150
4	1270.17	1272.38	443.9	0.01616	0.01008	0.01048	0.01084	0.01225	0.01136
5	1300.28	1293.43	447.4	0.01801	0.00991	0.01040	0.01074	0.01213	0.01117

TUNNEL STATIC PRESSURE= 0.371

HEATER TOTAL PRESSURE= 1940.

HEATER TOTAL TEMPERATURE= 495.

ALPHA= -0.02

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16 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 30170

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	2.61	182.85	79.2	83.1	82.2	90.2	148.2	207.2	654.2	481.3
2	2.61	182.32	80.0	84.4	83.1	93.2	151.8	214.7	645.3	480.9
3	2.61	183.90	79.6	84.4	83.6	94.6	150.4	222.2	637.1	481.3
4	2.61	182.32	80.5	86.2	84.4	97.2	151.3	229.6	630.5	481.3
5	2.61	184.43	81.4	88.4	86.2	99.4	152.2	235.8	623.0	481.3
6	2.61	185.48	80.9	89.3	86.6	100.7	148.7	243.7	616.6	481.8

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	181.27	178.64	480.0	0.05813	0.03744	0.03717	0.03733	0.04462	-0.00001
2	181.27	179.16	480.9	0.05841	0.03761	0.03744	0.03756	0.04495	0.00131
3	182.85	180.22	480.9	0.05807	0.03756	0.03718	0.03723	0.04483	0.00294
4	181.27	178.64	481.3	0.05874	0.03805	0.03767	0.03772	0.04517	0.00407
5	183.90	181.27	481.3	0.05801	0.03762	0.03724	0.03729	0.04469	0.00488
6	184.95	182.32	481.8	0.05806	0.03773	0.03729	0.03719	0.04470	0.00593

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 212. HEATER TOTAL TEMPERATURE= 575. ALPHA= -0.32

16 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 30270

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	2.61	404.43	159.2	163.6	184.3	187.8	149.1	303.1	526.2
2	2.61	410.74	159.2	165.4	184.8	190.0	150.4	313.7	526.2
3	2.61	411.80	159.2	165.0	184.3	191.4	152.6	322.0	524.0
4	2.61	409.69	159.2	166.7	184.3	192.2	148.2	333.0	524.4
5	2.61	410.22	159.2	166.3	183.9	194.4	151.3	340.0	522.2
6	2.61	413.90	159.2	168.5	184.3	195.8	147.6	349.8	522.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	403.90	397.59	526.6	0.05924	0.03753	0.03785	0.03748	0.04567	-0.00305
2	407.06	400.74	526.6	0.05925	0.03758	0.03788	0.03753	0.04509	-0.00261
3	412.32	405.48	524.4	0.05868	0.03737	0.03766	0.03737	0.04542	-0.00221
4	400.11	403.38	524.4	0.05986	0.03797	0.03827	0.03800	0.04616	-0.00204
5	410.74	404.43	522.2	0.05964	0.03780	0.03812	0.03759	0.04601	-0.00183
6	414.43	408.11	521.8	0.05945	0.03768	0.03800	0.03771	0.04584	-0.00145

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 500. HEATER TOTAL TEMPERATURE= 580. ALPHA= 0.00

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16 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 30370

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	2.61	618.11	105.1	106.0	110.0	113.5	150.0	337.9	539.8
2	2.61	630.74	105.1	106.0	109.5	115.2	150.0	349.8	538.5
3	2.61	628.11	105.1	108.2	110.4	119.3	147.8	362.1	536.8
4	2.61	638.64	105.1	109.1	111.3	120.5	148.2	372.2	535.4
5	2.61	642.85	105.1	110.4	111.7	123.2	147.8	381.4	534.1
6	2.61	636.01	106.0	111.3	112.2	126.7	150.9	388.9	531.7

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	618.64	609.69	539.8	0.05909	0.03743	0.03776	0.03761	0.04576	-0.00531
2	631.27	620.74	538.1	0.05835	0.03699	0.03730	0.03718	0.04519	-0.00485
3	628.11	618.64	536.3	0.05898	0.03736	0.03771	0.03757	0.04566	-0.00449
4	639.16	629.16	535.9	0.05842	0.03701	0.03736	0.03723	0.04521	-0.00401
5	641.80	632.85	535.0	0.05850	0.03705	0.03741	0.03730	0.04526	-0.00342
6	635.48	627.06	532.4	0.05926	0.03751	0.03792	0.03779	0.04588	-0.00307

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 810. HEATER TOTAL TEMPERATURE= 590. ALPHA= 0.00

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17 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 304/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	2.61	902.32	129.8	132.0	141.2	171.1	150.0	257.8	502.0
2	2.61	903.90	130.2	130.6	140.3	171.6	152.6	275.8	509.5
3	2.61	919.16	129.8	130.2	139.9	172.4	151.8	295.2	518.7
4	2.61	928.11	129.8	131.5	140.8	172.9	147.8	313.2	526.6
5	2.61	945.48	130.2	132.4	140.8	174.6	152.6	327.3	531.5
6	2.61	950.74	129.8	132.0	141.2	175.5	151.3	344.0	537.6

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	897.06	880.22	502.0	0.05770	0.03765	0.03734	0.03746	0.04201	-0.00403
2	907.59	889.16	510.4	0.05707	0.03726	0.03693	0.03706	0.04151	-0.00453
3	920.74	904.43	519.2	0.05668	0.03702	0.03667	0.03683	0.04121	-0.00475
4	923.95	907.06	527.1	0.05702	0.03719	0.03694	0.03707	0.04147	-0.00478
5	943.90	926.53	531.9	0.05656	0.03689	0.03668	0.03682	0.04117	-0.00483
6	949.69	930.74	537.6	0.05677	0.03701	0.03684	0.03698	0.04134	-0.00474

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 1200. HEATER TOTAL TEMPERATURE= 630. ALPHA= 0.00

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17 AUGUST 1973

MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 306/0

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	2.61	1373.41	88.8	90.6	91.9	99.8	152.2	362.5	631.4	569.3
2	2.61	1358.15	89.3	93.7	93.2	102.9	147.8	379.7	627.0	567.6
3	2.61	1298.15	89.7	94.6	93.7	106.9	152.6	392.0	620.4	563.6
4	2.61	1266.57	90.2	98.1	95.0	111.3	147.8	406.5	617.3	562.3
5	2.61	1218.15	90.6	100.7	96.3	114.8	152.2	415.3	611.1	557.4
6	2.61	1196.15	91.5	102.0	97.2	118.8	152.6	424.6	606.3	554.8

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1372.89	1350.26	569.8	0.05793	0.03695	0.03673	0.03705	0.03178	-0.03363
2	1352.89	1328.15	567.1	0.05721	0.03649	0.03629	0.03656	0.03134	-0.03430
3	1300.78	1279.73	563.6	0.05784	0.03690	0.03667	0.03700	0.03170	-0.03577
4	1267.62	1244.47	563.2	0.05759	0.03671	0.03655	0.03684	0.03150	-0.03676
5	1221.31	1198.15	558.3	0.05816	0.03712	0.03698	0.03725	0.03182	-0.03832
6	1199.73	1178.68	554.8	0.05768	0.03681	0.03665	0.03690	0.03156	-0.03915

TUNNEL STATIC PRESSURE= 2.610

HEATER TOTAL PRESSURE= 1890.

HEATER TOTAL TEMPERATURE= 645.

ALPHA= -0.02

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17 AUGUST 1973

MSFC PRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 307/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	2.61	1436.05	130.2	136.8	146.9	141.2	150.0	356.6	665.7	577.2
2	2.61	1456.57	130.2	137.7	148.2	143.0	151.3	376.2	652.5	580.3
3	2.61	1466.57	129.3	137.2	146.9	144.7	147.8	393.8	644.1	580.8
4	2.61	1469.73	129.3	138.1	146.9	146.9	148.7	408.7	638.4	582.5
5	2.61	1453.41	129.8	138.1	146.9	150.4	150.9	421.9	634.4	582.5
6	2.61	1435.52	129.8	139.4	147.8	152.6	152.6	432.9	630.9	580.3

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1440.26	1416.05	576.8	0.05712	0.03643	0.03615	0.03645	0.03076	-0.03136
2	1454.99	1425.52	580.3	0.05700	0.03638	0.03608	0.03636	0.03063	-0.03141
3	1465.52	1441.84	580.8	0.05716	0.03651	0.03616	0.03646	0.03066	-0.03134
4	1467.10	1442.36	583.4	0.05744	0.03665	0.03640	0.03663	0.03074	-0.03115
5	1452.89	1430.78	583.0	0.05756	0.03675	0.03648	0.03673	0.03079	-0.03159
6	1438.15	1411.84	580.8	0.05676	0.03625	0.03599	0.03621	0.03032	-0.03192

TUNNEL STATIC PRESSURE= 2.010 WATER TOTAL PRESSURE= 1995. HEAT R TOTAL TEMPERATURE= 640. ALPHA= -0.02

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23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 300/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCN	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	-0.25	-75.5	74.6	75.4	76.7	8.0	75.4	108.4	80.2
2	1.22	-0.25	-75.8	74.6	75.8	76.3	8.0	74.6	108.4	80.6
3	1.22	0.28	-74.5	76.3	76.7	76.7	8.0	75.0	108.4	81.1
4	1.22	0.88	-76.8	75.4	75.9	76.3	8.0	75.4	108.8	82.4
5	1.22	0.28	-75.8	74.6	75.4	76.3	8.0	74.6	108.4	81.1
6	1.21	0.28	-75.8	74.6	75.4	75.9	8.0	75.4	108.4	81.1

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	0.3	81.9 2.8088	1.19	5	0.82875	6	0.88214	11	.918	16	0.96974	23	0.93489	29	0.94682	34	1.25118	35	0.72970
2	0.8	82.4 0.8893	1.19	4	0.74599	7	0.88824	12	0.98821	17	0.98225	24	0.96481	30	0.94234	41	0.28589	36	0.90989
3	1.9	83.2 0.3168	1.19	3	1.44729	8	0.91793	13	0.98884	18	0.96481	25	0.97675	31	0.81976	42	0.24896	37	0.95255
4	0.8	84.1 0.7309	1.19	2	2.53881	9	0.98439	14	0.96083	19	0.98566	26	0.96019	32	0.99812	39	0.24769	38	0.99267
5	1.3	83.2 0.4161	1.19	1	2.58459	10	0.96783	15	1.08831	20	0.99139	27	0.97738	33	0.81976	40	0.24514	43	0.28717
6	1.3	83.2 0.4161	1.19																

WIND TUNNEL TEST CONDITIONS..... 0 10.296 PT 98.869 PS 1.215 R/L 10.3 MACH 3.488 TEMP 113.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1.1 TC= 83.8 PTC/PSA= 0.88 PSH(22)/PSA= 0.9796
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 650. HEATER TOTAL TEMPERATURE= 0.

23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
FLUME TECHNOLOGY TEST...NON-QUIETESCENT PHASE

TEST 575 RUN 51270

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCN	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	-0.25	-75.5	74.6	75.4	76.7	0.0	75.4	108.4	80.2
2	1.22	-0.25	-75.0	74.6	75.0	76.3	0.0	74.6	108.4	80.6
3	1.22	0.28	-74.5	76.3	76.7	76.7	0.0	75.0	108.4	81.1
4	1.22	0.80	-76.0	75.4	75.9	76.3	0.0	75.4	108.8	82.4
5	1.22	0.28	-75.0	74.6	75.4	76.3	0.0	74.6	108.4	81.1
6	1.21	0.28	-75.0	74.6	75.4	75.9	0.0	75.4	108.4	81.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	0.3	81.9 2.0080	1.19	5 0.82075	6 0.86214	11 0.93918	16 0.96974	23 0.93409	29 0.94682	34 1.25118	35 0.72970			
2	0.8	82.4 0.6893	1.19	4 0.76599	7 0.88824	12 0.98821	17 0.90225	24 0.96401	30 0.94236	41 0.28589	36 0.90989			
3	1.9	83.2 0.3160	1.19	3 1.44729	8 0.91753	13 0.98884	18 0.96401	25 0.97675	31 3.81976	42 0.24896	37 0.95255			
4	0.8	84.1 0.7309	1.19	2 2.53801	9 0.98439	14 0.96083	19 0.98566	26 0.96019	32 0.99012	39 0.24769	38 0.99267			
5	1.3	83.2 0.4161	1.19	1 2.58450	10 0.96783	15 1.00031	20 0.99139	27 0.97738	33 3.81976	40 0.24514	43 0.28717			
6	1.3	83.2 0.4161	1.19				21 0.98439	28 0.96401						

WIND TUNNEL TEST CONDITIONS..... Q 10.296 PT 98.069 PS 1.215 R/L 10.3 MACH 3.480 TEMP 113.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1.1 TC= 83.0 PTC/PSA= 0.68 PSM(22)/PSA= 0.9796
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 650. HEATER TOTAL TEMPERATURE= 0.

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23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 308/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	505.52	17.1	106.7	110.1	116.2	0.0	139.6	308.7
2	1.21	508.68	15.8	103.6	108.8	114.0	0.0	151.3	297.4
3	1.21	508.15	13.4	102.7	108.4	113.6	0.0	161.7	283.1
4	1.21	513.41	17.6	103.2	107.5	113.2	0.0	167.8	287.8
5	1.21	517.62	17.6	101.4	106.2	112.7	0.0	174.3	250.1
6	1.21	517.18	12.9	102.3	106.2	111.9	0.0	179.8	233.7

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	503.9	307.8	0.0377	0.83	5	0.82626	6	0.86321	11	0.93966	16	0.97151	23	0.93647	29	0.94888	34	0.91163	35	0.78841
2	507.6	297.8	0.0376	0.84	4	0.77657	7	0.88423	12	0.98999	17	0.93265	24	0.96641	30	0.93838	41	0.78267	36	0.90271
3	507.1	282.2	0.0379	0.85	3	1.45249	8	0.91927	13	0.99198	18	0.96968	25	0.97979	31	0.93818	42	0.73787	37	0.94893
4	512.9	267.8	0.0377	0.85	2	2.52975	9	0.99126	14	0.96514	19	0.98887	26	0.96323	32	0.93520	39	0.98553	38	1.00145
5	517.1	250.1	0.0375	0.85	1	2.92791	10	0.96896	15	1.00209	20	0.99449	27	0.98043	33	0.93138	40	0.76319	43	0.78586
6	516.6	233.7	0.0376	0.85																
						</														

WIND TUNNEL TEST CONDITIONS..... 0 10,298 PT 98.023 PS 1.214 R/L 10.6 MACH 3.488 TEMP 103.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 510.9 TC= 273.8 PTC/PSA= 420.70 PSM(22)/PSA= 0.6963
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 0.

HSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODFL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.22	1097.12	11.9	75.4	75.0	75.4	0.0	74.1	55.5	53.3
2	1.21	1110.80	12.4	74.1	74.1	74.6	0.0	72.0	49.4	48.1
3	1.21	1109.75	16.6	75.9	75.0	74.1	0.0	69.4	43.4	42.9
4	1.21	1084.49	18.2	73.7	74.1	74.1	0.0	66.8	38.2	38.2
5	1.21	1088.17	17.6	73.7	73.7	73.7	0.0	63.7	32.5	35.6
6	1.21	1091.85	15.0	73.3	73.7	72.8	0.0	61.1	28.6	33.0

[illegible]

WIND TUNNEL TEST CONDITIONS.....	0	10.294	PT	90.056	PS	1.215	R/L	10.5	MACH	3.480	TEMP	104.9
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1097.2	TC=	42.6	PTC/PSA=	903.21	PSM(22)/PSA=	1.0903				
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	1200.			HEATER TOTAL TEMPERATURE=	0.						

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23 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL MUMTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 31070

FRAME	PSA	PTC	TEMPERATURE BLYA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1455.54	17.6	63.3	62.9	62.4	0.0	73.7	105.0	137.0
2	1.21	1427.64	15.0	63.3	63.3	62.0	0.0	81.5	100.1	111.4
3	1.21	1439.22	16.6	65.0	63.7	63.3	0.0	85.8	89.3	89.3
4	1.22	1443.43	12.9	63.7	63.3	62.9	0.0	86.7	74.6	72.4
5	1.22	1436.99	12.4	64.2	63.7	63.3	0.0	85.8	61.1	60.3
6	1.21	1385.01	17.1	63.7	63.7	63.3	0.0	81.5	49.0	50.3

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1454.5	137.4	0.0365	1.35	5 0.02548	6 0.00170	11 0.92602	16 0.96232	23 0.93175	29 0.93076	34 0.93239	35 0.70439			
2	1428.7	112.7	0.0365	1.37	4 0.77572	7 0.00144	12 0.98324	17 0.91711	24 0.96296	30 0.93303	41 1.13074	36 0.69673			
3	1437.1	91.0	0.0365	1.40	3 1.45845	8 0.90819	13 0.98462	18 0.95050	25 0.97506	31 0.92411	42 1.23610	37 0.93367			
4	1442.9	73.7	0.0365	1.44	2 2.53980	9 0.98271	14 0.95468	19 0.97825	26 0.95659	32 0.92984	39 1.00245	38 0.98143			
5	1435.5	60.7	0.0367	1.47	1 2.95448	10 0.95050	15 0.99608	20 0.98716	27 0.97570	33 0.92602	40 1.31643	43 1.20052			
6	1381.9	50.3	0.0370	1.48				21 1.33601	28 0.95978						

WIND TUNNEL TEST CONDITIONS..... 0 10.295 PT 90.848 PS 1.115 R/L 10.6 MACH 3.400 TEMP 104.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1430.1 TC= 87.6 PTC/PSA= 1177.35 PSH(22)/PSA= 1.1657
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 0.

100 475 44 021.0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					TCH		
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1762.38	12.4	66.3	66.3	65.9	0.0	94.1	147.0	160.0
2	1.21	1765.54	16.1	67.2	66.8	66.8	0.0	102.3	132.7	123.1
3	1.21	1707.64	11.9	66.8	66.8	66.8	0.0	105.8	111.9	95.4
4	1.21	1551.33	16.6	65.9	66.3	66.8	0.0	104.0	89.7	74.6
5	1.21	1377.12	17.6	65.0	66.3	67.2	0.0	100.1	70.7	62.0
6	1.21	1237.64	12.4	66.8	66.3	66.8	0.0	96.2	57.7	54.6

[illegible]

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.031 PS 1.214 R/L 10.5 MACH 3.480 TEMP 105.0
MODEL ATTITUDE..... ALPHA 0.02 BETA 8.80 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1567.1 TC= 95.7 PTC/PSA= 1290.40 PSM(221)/PSA= 1.2116
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1980. HEATER TOTAL TEMPERATURE= 0.

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23 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 312/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.05	1060.22	1031.8	85.8	84.5	82.8	80.0	86.3	85.6	70.2
2	5.07	1065.48	1041.3	85.4	85.0	79.8	80.0	84.5	71.5	61.6
3	5.07	1044.95	1022.8	87.1	85.4	77.6	80.0	82.4	61.1	93.8
4	5.06	1700.74	1675.5	85.8	85.0	74.6	80.0	79.8	52.0	47.7
5	5.10	1538.74	1507.6	86.7	85.0	72.0	80.0	76.3	43.8	42.5
6	5.05	1379.69	1355.5	86.3	85.4	70.2	80.0	73.7	37.7	39.0

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1059.2	72.0 0.0361	5.03	5	0.89138	6	0.87916	11	0.97363	16	0.94174	23	0.94022	29	0.94785	34	1.15390	35	0.97303
2	1064.4	62.0 0.0362	5.91	4	0.78482	7	0.95781	12	0.95853	17	0.98286	24	0.97998	30	0.96548	41	1.24090	36	1.17298
3	1040.1	54.6 0.0362	5.95	3	0.99211	8	0.99364	13	0.94488	18	0.92724	25	0.93411	31	1.00127	42	1.26038	37	1.06498
4	1701.8	48.6 0.0368	5.82	2	1.33096	9	1.01453	14	0.94785	19	0.95395	26	0.91503	32	1.03790	39	1.21648	38	1.11117
5	1529.7	43.8 0.0370	5.65	1	1.43551	10	0.99593	15	0.99522	20	0.98922	27	0.93945	33	1.00585	40	1.19893	43	1.18672
6	1382.3	41.2 0.0372	5.44																

WIND TUNNEL TEST CONDITIONS..... 0 7.742 PT 18.011 PS 5.068 R/L 5.3 MACH 1.477 TEMP 103.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1697.6 TC= 53.7 PTC/PSA= 334.94 PSH(22)/PSA= 1.1377
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 0.

TEST 575

WIND TUNNEL TEST CONDITIONS.....	Q	7.745	PT	18.013	PS	5.095	R/L	5.3	MACH	1.474	TEMP	104.6
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1695.1	TC=	66.8	PTC/PSA=	332.73			PSM(22)/PSA=	1.7769		
HEATER PARAMETERS.....	HEATER TOTAL	PRESSURE=	2100.		HEATER TOTAL	TEMPERATURE=	0.					

23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TEST...NON-QUIESCENT PHASE

TEST 575 RUN 313/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.89	1406.81	1386.5	78.5	76.3	75.4	8.0	73.7	49.4	62.0
2	5.88	1417.86	1397.1	79.8	77.2	75.8	8.0	73.7	48.6	56.8
3	5.88	1424.43	1404.4	79.8	77.6	73.7	8.0	72.4	45.5	52.0
4	5.89	1431.68	1415.8	88.6	78.8	71.5	8.0	78.7	41.2	47.3
5	5.86	1440.74	1419.7	79.8	78.8	69.4	8.0	68.9	37.3	44.7
6	5.10	1432.85	1415.5	88.6	78.5	67.6	8.0	66.8	34.3	42.7

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1409.7	62.9 0.0366	5.34	5 0.88211	6 0.87298	11 0.96851	16 0.94681	23 0.93843	29 0.94989	34 1.03738	35 0.97192				
2	1417.6	57.7 0.0368	5.38	4 0.78241	7 0.96127	12 0.95137	17 0.89018	24 0.97116	30 0.95898	41 1.12186	36 1.16752				
3	1425.5	53.8 0.0368	5.40	3 0.98106	8 0.98791	13 0.93843	18 0.91843	25 0.92854	31 0.99819	42 1.15386	37 1.06897				
4	1431.3	49.8 0.0378	5.45	2 1.32587	9 1.01378	14 0.94884	19 0.94452	26 0.91180	32 1.03814	39 1.13099	38 1.09378				
5	1441.3	45.5 0.0369	5.46	1 1.41184	10 0.99019	15 0.99704	20 0.96355	27 0.93311	33 1.00088	40 1.15839	43 1.14812				
6	1432.8	43.8 0.0378	5.47				21 0.97877	28 0.94681							

WIND TUNNEL TEST CONDITIONS..... 0 7.744 PY 10.813 PS 5.882 R/L 5.3 MACH 1.476 TEMP 103.4
 MODEL ATTITUDE..... ALPHA 0.82 BETA 0.88 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1426.4 TC= 52.1 PTC/PSA= 280.66 PSH(22)/PSA= 1.0658
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1686. HEATER TOTAL TEMPERATURE= 8.

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23 AUGUST 1973

MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 R/JN 31470

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.05	972.85	958.1	75.9	74.6	74.1	0.0	68.5	37.7	55.5
2	5.06	977.59	963.4	77.6	75.9	74.6	0.0	67.6	38.6	52.9
3	5.09	976.01	965.0	76.7	76.3	74.1	0.0	67.2	37.7	50.7
4	5.06	983.38	967.1	78.9	76.7	74.6	0.0	66.8	37.7	46.8
5	5.09	987.59	976.0	78.0	76.7	73.3	0.0	64.6	34.7	46.0
6	5.09	990.22	977.1	78.0	76.7	72.8	0.0	63.7	32.5	44.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	971.3	56.4 0.0373	5.02	5 0.88440	6 0.88058	11 0.96445	16 0.94158	23 0.93548	29 0.94691	34 0.96750	35 0.97436			
2	975.5	53.8 0.0374	5.05	4 0.77918	7 0.96598	12 0.95301	17 0.98041	24 0.97131	30 0.96140	41 0.98961	36 1.17183			
3	976.5	52.0 0.0375	5.04	3 0.98351	8 0.98580	13 0.93472	18 0.91642	25 0.92862	31 0.99342	42 1.01019	37 1.06128			
4	982.8	48.1 0.0374	5.05	2 1.31363	9 1.80943	14 0.93853	19 0.94310	26 0.98956	32 1.84298	39 0.98504	38 1.08110			
5	986.5	47.3 0.0375	5.08	1 1.41656	10 0.99837	15 0.99723	20 0.96598	27 0.93700	33 1.00410	40 1.01706	43 0.99876			
6	988.6	44.7 0.0376	5.09				21 0.96826	28 0.95301						

WIND TUNNEL TEST CONDITIONS..... 0 7.743 PT 10.013 PS 5.073 R/L 5.3 MACH 1.477 TEMP 102.9
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 988.2 TC= 50.4 PTC/PSA= 193.21 PSM(221)/PSA= 0.9965
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 6.

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23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 975 RUN 319/6

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.20	502.85	496.8	78.8	75.4	75.4	0.0	70.2	36.8	56.4
2	5.19	506.01	498.6	78.9	75.9	75.9	0.0	69.4	36.8	53.8
3	5.21	508.64	500.7	79.3	76.7	76.3	0.0	68.5	35.6	52.0
4	5.17	509.69	502.8	79.8	77.2	76.7	0.0	67.6	35.1	50.3
5	5.20	510.74	503.4	79.8	78.0	77.2	0.0	67.6	34.3	48.1
6	5.25	510.74	503.9	80.2	77.6	77.2	0.0	66.8	33.4	46.9

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	501.3	57.2 0.0380	5.06	5 0.88013	6 0.98169	11 0.94783	16 0.93811	23 0.94834	29 0.94852	34 0.96711	35 0.98197				
2	505.8	55.5 0.0381	5.04	4 0.88134	7 0.94488	12 0.94783	17 0.98466	24 1.00582	30 0.99833	41 0.88877	36 1.12395				
3	508.6	53.3 0.0381	5.06	3 1.01988	8 1.03995	13 0.95373	18 0.94488	25 0.93440	31 1.02863	42 0.82141	37 1.05482				
4	509.7	52.0 0.0382	5.04	2 1.34399	9 0.99238	14 0.94778	19 0.95521	26 0.98912	32 1.01617	39 0.88134	38 1.09719				
5	509.7	49.4 0.0381	5.04	1 1.45103	10 0.99907	15 0.93968	20 1.01171	27 0.99881	33 1.02863	40 0.81620	43 0.88877				
6	509.7	47.7 0.0383	5.08					21 0.96785	28 0.93514						

WIND TUNNEL TEST CONDITIONS..... 0 7.753 PT 18.013 PS 5.203 R/L 5.3 NACH 1.459 TEMP 102.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 507.3 TC= 52.5 PTC/PSA= 97.50 PSH(22)/PSA= 0.9789
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 0.

A-142

7-557 575 5-4 315/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT				MODEL-STING FEEDER-PIPE	TCH		
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)				
1	5.15	501.80	495.0	101.9	104.9	103.2	0.0	155.2	475.1	245.6
2	5.18	504.43	498.1	102.7	104.9	103.2	0.0	156.7	431.6	232.8
3	5.21	510.22	500.2	101.4	104.0	103.6	0.0	161.3	391.5	219.1
4	5.17	509.16	502.8	100.6	104.0	103.2	0.0	162.1	355.9	205.1
5	5.17	512.32	505.5	100.6	102.7	103.6	0.0	161.7	320.8	169.0
6	5.16	516.01	508.1	100.1	102.3	104.0	0.0	160.6	288.3	175.1

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	500.2	245.8	0.0379	5.45	5 0.90617	6 0.92337	11 0.92262	16 0.97720	23 0.94057	29 1.04674	34 1.03029	35 0.95029
2	502.8	232.8	0.0380	5.43	4 0.88673	7 0.91365	12 0.92412	17 0.97421	24 0.97421	30 1.07216	41 0.86729	36 1.16487
3	509.2	218.5	0.0377	5.45	3 1.04823	8 1.05122	13 1.01159	18 1.02505	25 0.94281	31 1.06711	42 0.88150	37 1.14543
4	508.6	205.5	0.0379	5.44	2 1.38842	9 1.08860	14 0.96973	19 1.05346	26 0.93234	32 1.08935	39 0.85832	38 1.17982
5	511.8	190.3	0.0379	5.43	1 1.43253	10 0.99066	15 0.97571	20 1.12599	27 0.97346	33 1.11477	40 0.87851	43 0.86655
6	514.4	175.1	0.0378	5.43				21 1.03178	28 1.03702			

WIND TUNNEL TEST CONDITIONS.....	Q	7.752	PT	18.015	PS	5.173	R/L	5.3	MACH	1.463	TEMP	104.9
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.80	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	507.0	TC=	211.3	PTC/PSA=	98.17	PSM(22)/PSA=	1.0511				
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	400.			HEATER TOTAL TEMPERATURE=	0.						

TEST 575 RUN 316/0

WIND TUNNEL TEST CONDITIONS.....	Q	7.507	PT	10.015	PS	7.351	R/L	5.4	MACH	1.208	TEMP	103.3
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	514.6	TC=	111.6	PTC/PSA=	70.01	PSH(221)/PSA= 8.9170					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=				640.	HEATER TOTAL TEMPERATURE=				0.		

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23 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575

EJN 317/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.38	1045.48	1032.8	87.1	84.1	86.3	0.0	81.1	54.6	61.1
2	7.36	1050.74	1038.1	86.7	84.5	86.7	0.0	79.3	50.7	55.9
3	7.36	1054.95	1045.0	87.1	85.0	86.7	0.0	77.2	46.4	51.6
4	7.37	1053.90	1044.4	86.7	85.0	85.4	0.0	74.6	41.6	47.7
5	7.37	1069.69	1054.4	88.0	86.3	85.0	0.0	73.3	38.2	43.8
6	7.36	1064.95	1051.3	87.1	85.8	83.2	0.0	70.2	33.0	41.6

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1045.5	61.6 0.0373	7.14	5 0.89170	6 0.99777	11 0.96522	16 1.00565	23 0.93083	29 1.02876	34 0.95366	35 1.12381				
2	1048.6	57.7 0.0374	7.16	4 0.76198	7 0.98387	12 0.97572	17 1.04294	24 0.99725	30 1.01300	41 0.95786	36 0.99567				
3	1053.9	52.5 0.0373	7.16	3 0.94946	8 0.97389	13 0.93738	18 1.01458	25 0.92425	31 0.97519	42 0.97152	37 1.01026				
4	1054.4	48.6 0.0375	7.18	2 1.28018	9 0.99200	14 0.99418	19 1.00355	26 1.00723	32 0.97887	39 0.96679	38 0.95156				
5	1069.7	44.7 0.0371	7.20	1 1.36223	10 0.97414	15 1.00198	28 0.99935	27 1.02246	33 0.98832	40 0.98822	43 0.97834				
6	1063.9	42.9 0.0375	7.21					21 0.95366	28 1.01983						

WIND TUNNEL TEST CONDITIONS..... 0 7.497 PT 18.002 PS 7.366 R/L 5.4 MACH 1.206 TEMP 102.9
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1056.0 TC= 51.3 PTC/PSA= 143.37 PSM(22)/PSA= 0.9748
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1200. HEATER TOTAL TEMPERATURE= 8.

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23 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 318/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.36	1527.59	1510.7	81.1	78.9	78.9	0.0	72.0	46.4	58.1
2	7.35	1537.59	1520.2	82.4	79.8	78.0	0.0	70.7	44.7	53.3
3	7.35	1549.69	1531.3	82.8	81.1	76.3	0.0	69.4	40.8	47.7
4	7.36	1543.90	1525.5	84.1	81.1	74.1	0.0	67.6	37.7	43.4
5	7.36	1477.06	1455.5	83.2	81.5	72.0	0.0	65.5	33.6	40.8
6	7.36	1340.22	1324.4	85.4	82.8	71.1	0.0	64.2	31.2	36.0

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1529.2	59.4 0.0366	7.99	5 0.88998	6 0.99616	11 0.96620	16 1.00195	23 0.93256	29 1.02665	34 1.07922	35 1.12128				
2	1538.1	54.2 0.0367	8.05	4 0.76224	7 0.97724	12 0.97471	17 1.04242	24 0.99511	30 1.01456	41 1.12653	36 0.99616				
3	1549.7	48.6 0.0366	8.10	3 0.94833	8 0.97251	13 0.93939	18 1.01667	25 0.92835	31 0.97724	42 1.14493	37 1.01614				
4	1545.0	44.7 0.0366	8.14	2 1.28949	9 0.99038	14 0.99406	19 1.00457	26 1.00405	32 0.98197	39 1.13818	38 1.07344				
5	1477.1	41.6 0.0369	8.03	1 1.36467	10 0.97461	15 1.00195	20 1.00195	27 1.02140	33 1.00457	40 1.13599	43 1.13179				
6	1340.2	37.7 0.0372	7.77				21 0.96620	28 1.02035							

WIND TUNNEL TEST CONDITIONS..... 0 7.504 PT 10.013 PS 7.358 R/L 5.4 MACH 1.207 TEMP 103.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1496.5 TC= 47.7 PTC/PSA= 203.39 PSM(22)/PSA= 1.0000
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1740. HEATER TOTAL TEMPERATURE= 0.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

KUN 51970

[illegible]

WIND TUNNEL TEST CONDITIONS..... 0 7.500 PT 10.007 PS 7.362 R/L 5.4 MACH 1.207 TEMP 102.6
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1737.5 TC= 51.4 PTC/PSA= 236.01 PSM(22)/PSA= 1.1550
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 0.

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23 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

DET 575 RUN 11071

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCN	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	1854.43	1823.4	95.4	94.1	93.6	0.0	109.7	160.8	91.9
2	7.44	1855.48	1837.6	94.9	93.6	91.9	0.0	106.7	124.9	75.1
3	7.44	1854.95	1831.3	93.2	93.2	88.9	0.0	103.6	96.6	63.7
4	7.47	1817.06	1796.5	93.6	92.8	85.8	0.0	99.3	78.5	54.2
5	7.52	1652.85	1638.1	94.5	92.8	83.2	0.0	94.5	64.2	48.1
6	7.55	1486.53	1474.4	92.8	92.8	79.8	0.0	89.7	53.8	42.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1855.0	94.1 0.0357	9.43	5 0.89898	6 0.96786	11 0.99945	16 1.07971	23 1.06469	29 1.08385	34 1.25267	35 1.15169		
2	1856.0	78.0 0.0360	9.53	4 0.80732	7 1.05641	12 0.99478	17 1.11648	24 1.05952	30 1.07712	41 1.29131	36 1.11138		
3	1855.0	64.6 0.0361	9.61	3 0.95750	8 1.12891	13 1.01187	18 1.09680	25 0.98598	31 1.08541	42 1.31430	37 1.10923		
4	1816.5	55.1 0.0362	9.60	2 1.29514	9 1.09369	14 1.02327	19 1.10509	26 1.05952	32 1.11803	39 1.38135	38 1.29386		
5	1653.4	49.4 0.0367	9.37	1 1.40544	10 1.04087	15 1.10250	20 1.13201	27 1.09784	33 1.15371	40 1.28864	43 1.28617		
6	1485.0	44.2 0.0369	9.02										

WIND TUNNEL TEST CONDITIONS..... Q 7.473 PT 18.013 PS 7.469 R/L 5.4 MACH 1.196 TEMP 101.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1753.5 TC= 64.2 PTC/PSA= 234.75 PSM(22)/PSA= 1.2628
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 8.

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23 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

724 275 RUN 32070

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.54	1841.27	1820.2	94.5	92.8	88.0	0.0	87.1	48.5	61.1
2	10.53	1856.01	1837.6	92.8	92.8	84.1	0.0	84.1	45.5	55.5
3	10.53	1859.69	1837.6	93.6	92.8	81.5	0.0	81.5	42.5	49.0
4	10.53	1740.22	1721.8	93.6	92.8	77.6	0.0	78.0	37.7	42.5
5	10.50	1567.06	1546.0	92.3	92.3	73.7	0.0	74.1	32.1	39.9
6	10.59	1404.95	1389.2	92.8	91.5	71.1	0.0	72.0	28.6	36.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1843.4	62.9 0.0361	11.50	5 0.99763	6 0.97891	11 0.96166	16 1.00791	23 0.96203	29 1.03470	34 1.08462	35 1.05012			
2	1858.6	56.8 0.0361	11.52	4 0.95432	7 0.96423	12 0.96974	17 1.04718	24 0.96385	30 1.03324	41 1.09637	36 1.05306			
3	1857.6	50.3 0.0360	11.55	3 0.87687	8 0.98699	13 0.97891	18 1.02736	25 0.95762	31 1.04058	42 1.11509	37 1.06260			
4	1746.8	44.2 0.0365	11.46	2 1.08389	9 0.97891	14 0.98992	19 1.03434	26 0.98919	32 1.05085	39 1.08683	38 1.09233			
5	1565.5	41.2 0.0367	11.25	1 1.15546	10 0.96166	15 1.00020	20 1.03581	27 1.00534	33 1.05049	40 1.07361	43 1.07545			
6	1404.4	38.2 0.0372	11.12				21 0.99984	28 1.01782						

WIND TUNNEL TEST CONDITIONS..... Q 6.098 PT 18.007 PS 19.538 R/L 5.1 MACH 0.909 TEMP 103.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1712.6 TC= 48.9 PTC/PSA= 162.51 PSM(22)/PSA= 1.0817
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 3100. HEATER TOTAL TEMPERATURE= 0.

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22 AUGUST 1973

NSFC TRISONIC WIND TUNNEL MONTGOMERY, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUISCENT PHASE

TEST 575 RUN 320 1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.62	1872.85	1854.4	110.1	111.0	99.3	0.0	170.4	466.0	196.0
2	10.62	1883.90	1863.4	109.7	109.7	99.3	0.0	172.1	352.9	151.7
3	10.61	1873.38	1859.2	109.7	109.7	99.7	0.0	169.1	266.6	116.6
4	10.62	1839.17	1830.7	108.4	108.4	100.1	0.0	168.4	198.1	90.2
5	10.59	1707.06	1688.1	109.3	108.4	99.7	0.0	152.6	150.4	72.4
6	10.55	1529.69	1515.0	108.4	107.5	97.1	0.0	148.9	114.9	62.0

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1873.4	196.8	0.0357	11.32	5	1.00851	6	0.98372	11	0.96292	16	1.00634	23	0.96482	29	1.02970	34	1.06353	35	1.05195
2	1881.8	152.6	0.0358	11.37	4	0.95636	7	0.96840	12	0.97496	17	1.04575	24	0.97132	30	1.03843	41	1.07531	36	1.05159
3	1872.3	118.4	0.0360	11.42	3	0.88593	8	0.99175	13	0.98263	18	1.02405	25	0.96329	31	1.03626	42	1.09820	37	1.06835
4	1833.9	91.9	0.0363	11.45	2	1.08516	9	0.98810	14	0.99394	19	1.03663	26	0.99503	32	1.05813	38	1.08878	38	1.08735
5	1787.6	74.1	0.0364	11.35	1	1.15485	10	0.96913	15	1.00488	20	1.04137	27	1.01036	33	1.05527	40	1.08224	43	1.07859
6	1533.9	63.7	0.0367	11.16																
				</																

WIND TUNNEL TEST CONDITIONS..... Q 4.867 PT 18.015 PS 10.081 R/L 5.1 MACH 0.984 TEMP 182.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.06 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1783.8 TC= 116.2 PTC/PSA= 168.27 PSM(22)/PSA= 1.0781
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 8.

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23 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

RUN 12170

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING	FEEDBACK	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.51	1388.11	1369.7	89.3	88.9	86.7	0.0	79.3	77.2	56.5
2	10.53	1405.48	1387.1	89.3	88.4	84.1	0.0	77.2	39.0	55.5
3	10.53	1409.69	1396.0	90.2	88.9	82.4	0.0	75.4	74.0	51.6
4	10.54	1423.90	1408.6	91.9	89.7	79.8	0.0	74.6	38.2	46.8
5	10.53	1424.43	1408.1	91.0	89.7	77.2	0.0	71.1	35.6	43.8
6	10.53	1414.95	1402.8	91.0	89.3	74.6	0.0	69.4	32.1	42.1

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1387.6	59.8 0.8369	10.98	5 0.99539	6 0.97665	11 0.95461	16 0.99503	23 0.95865	29 1.02001	34 1.03581	35 1.04279				
2	1405.0	56.4 0.8367	11.08	4 0.95571	7 0.96563	12 0.96673	17 1.03655	24 0.96416	30 1.01817	41 1.04794	36 1.04389				
3	1410.2	52.9 0.8369	11.04	3 0.87818	8 0.98768	13 0.97518	18 1.01156	25 0.95350	31 1.02033	42 1.06484	37 1.04757				
4	1422.3	47.7 0.8368	11.07	2 1.08505	9 0.98833	14 0.98621	19 1.02001	26 0.98547	32 1.03177	38 1.04720	38 1.05859				
5	1425.0	45.5 0.8365	11.07	1 1.15927	10 0.96526	15 1.08854	20 1.02046	27 1.08605	33 1.03944	43 1.05602	43 1.05896				
6	1415.0	43.4 0.8369	11.07				21 0.99319	28 1.01266							

WIND TUNNEL TEST CONDITIONS..... 0 6.101 PT 10.880 PS 10.527 R/L 5.1 MACH 0.910 TEMP 102.9
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1410.8 TC= 50.8 PTC/PSA= 134.02 PSH(22)/PSA= 1.0484
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 4.

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23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 322/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.56	933.38	921.8	87.6	86.7	86.3	8.0	77.6	37.3	58.5
2	10.54	939.69	928.1	88.9	87.6	85.8	8.0	76.3	38.6	53.8
3	10.56	950.22	935.8	90.2	88.4	86.3	8.0	75.4	37.7	49.4
4	10.56	952.85	948.2	88.4	87.6	85.4	8.0	72.8	36.0	47.3
5	10.56	956.81	945.8	88.9	88.4	84.1	8.8	78.7	32.1	44.2
6	10.58	957.86	945.8	91.8	89.3	83.7	8.8	69.4	29.5	40.3

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	932.3	59.4 0.0374	10.30	5 0.99672	6 0.97804	11 0.95423	16 0.98427	23 0.95863	29 1.00698	34 0.96559	35 1.04178							
2	938.1	54.2 0.0374	10.32	4 0.98448	7 0.96595	12 0.96339	17 1.02346	24 0.96412	30 0.99045	41 0.96942	36 1.03262							
3	949.7	50.7 0.0373	10.35	3 0.88868	8 0.98838	13 0.97188	18 0.99343	25 0.95130	31 0.99636	42 0.98178	37 1.03879							
4	952.3	48.6 0.0373	10.35	2 1.00244	9 0.97731	14 0.97731	19 0.99416	26 0.97694	32 0.99746	39 0.96669	38 0.99123							
5	955.0	45.1 0.0374	10.37	1 1.19643	10 0.96339	15 0.99858	20 0.99599	27 0.99559	33 0.99343	40 0.97328	43 0.98134							
6	958.1	41.2 0.0375	10.41				21 0.96449	28 1.00185										

WIND TUNNEL TEST CONDITIONS..... 0 6.088 PT 10.887 PS 10.559 R/L 5.1 MACH 0.988 TEMP 102.4
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 947.6 TC= 49.9 PTC/PSA= 89.74 PSH(22)/PSA= 0.9802
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 100. HEATER TOTAL TEMPERATURE= 0.

A-152

1-57 575 404 323/0

WIND TUNNEL TEST CONDITIONS.....										Q	6.055	PT	10.004	PS	10.409	R/L	3.1	MACH	0.983	TEMP	102.5
MODEL ATTITUDE.....										ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..										PTC=	469.8	TC=	57.9	PTC/PSA=	44.28	PSN(22)/PSA= 0.8914					
HEATER PARAMETERS.....										HEATER TOTAL PRESSURE=				400.	HEATER TOTAL TEMPERATURE=					0.	

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23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 32870

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.56	1488.11	1467.1	90.2	93.2	97.5	0.0	197.3	426.1	397.1
2	7.56	1479.17	1459.2	90.2	93.6	99.3	0.0	212.4	443.5	415.3
3	7.56	1473.90	1467.1	91.0	93.6	101.0	0.0	226.0	457.4	430.9
4	7.57	1502.32	1490.7	90.2	93.6	103.2	0.0	242.3	469.5	442.2
5	7.56	1482.32	1469.2	90.6	94.1	106.2	0.0	256.6	480.0	446.7
6	7.57	1441.88	1429.7	92.8	94.9	109.7	0.0	269.6	488.1	451.7

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	
1	1491.3	396.7	0.0364	7.77	9	0.98456	6	1.00274	11	0.98875	16	1.01088	23	0.91172	29	1.01246	34	1.02106	35	1.13978
2	1485.5	414.4	0.0363	7.77	4	0.84536	7	0.95814	12	0.94998	17	1.04027	24	0.99967	30	0.98987	41	1.05336	36	1.01659
3	1473.4	430.9	0.0369	7.79	3	0.93774	8	1.00376	13	0.96183	18	0.99916	25	1.00004	31	0.97922	42	1.06019	37	1.01008
4	1502.3	441.7	0.0365	7.81	2	1.20244	9	0.98842	14	1.00274	19	0.99298	26	1.00663	32	0.98268	39	1.05745	38	1.02217
5	1482.6	446.7	0.0365	7.79	1	1.32949	10	0.98842	15	1.01501	20	0.98484	27	1.04007	33	0.98638	40	1.06666	43	1.05899
6	1441.3	451.7	0.0367	7.74									21	0.96695	28	1.03189				

WIND TUNNEL TEST CONDITIONS..... 0 7.448 PT 10.017 PS 7.564 R/L 5.4 MACH 1.186 TEMP 102.4
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1479.4 TC= 430.7 PTC/PSA= 195.58 PSH(22)/PSA= 1.0282
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 560.

TPSP 572 RUN 32970

WIND TUNNEL TEST CONDITIONS.....	Q	7.456	PT	18.019	PS	7.542	R/L	5.4	MACH	1.189	TEMP	102.2
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1251.8	TC=	423.6	PTC/PSA=	165.98	PSM(22)/PSA= 0.9901					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1668.					HEATER TOTAL TEMPERATURE= 550.						

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST., NON-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-SYING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1836.85	1869.2	114.9	117.5	118.8	0.0	192.2	148.5	162.7
2	1.21	1772.36	1747.6	114.9	115.8	116.2	0.0	146.5	121.8	181.9
3	1.21	1661.31	1633.9	113.6	114.9	113.2	0.0	148.5	118.6	113.2
4	1.21	1568.26	1533.4	111.4	114.5	111.4	0.0	135.3	111.8	122.3
5	1.21	1464.47	1439.2	111.9	113.6	109.3	0.0	132.2	115.3	127.8
6	1.21	1381.84	1362.4	110.1	114.8	108.4	0.0	130.1	119.7	130.5

[illegible]

WIND TUNNEL TEST CONDITIONS.....	Q	16.288	PT	98.002	PS	1.214	R/L	10.4	MACH	3.480	TEMP	109.6
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.80	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1613.0	TC=	117.8	PTC/PSA=	1328.59	PSM(221)/PSA= 1.3961					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2060.					HEATER TOTAL TEMPERATURE= 620.						

A-156

45FC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING	FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	974.99	961.3	98.4	101.4	101.0	0.0	113.2	139.2	108.4
2	1.21	981.31	965.0	98.8	108.4	99.7	0.0	112.7	122.7	96.7
3	1.21	987.10	972.4	98.0	99.7	99.3	0.0	110.1	106.7	86.7
4	1.21	990.26	979.2	96.7	99.3	98.4	0.0	108.0	92.8	78.5
5	1.21	994.99	979.7	97.1	98.8	97.1	0.0	104.5	80.2	69.4
6	1.21	998.15	985.0	95.4	97.5	96.2	0.0	101.0	69.8	64.6

[illegible]

WIND TUNNEL TEST CONDITIONS..... Q 10.298 PT 98.819 PS 1.214 R/L 10.4 NACH 3.488 TEMP 109.6
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 987.9 TC= 85.6 PTC/PSA= 813.56 PSN(221)/PSA= 8.9916
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1000. HEATER TOTAL TEMPERATURE= 620.

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 340/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.22	433.90	427.1	99.3	102.7	104.9	0.0	122.7	291.3
2	1.22	430.22	422.3	98.4	101.9	104.9	0.0	126.2	283.5
3	1.22	433.90	425.5	98.0	101.0	103.6	0.0	130.9	274.8
4	1.21	432.32	426.5	95.8	99.7	102.3	0.0	134.8	266.6
5	1.21	433.90	427.6	97.1	100.1	104.0	0.0	130.3	261.0
6	1.22	433.90	429.7	94.5	98.4	102.3	0.0	140.9	257.1

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	431.8	210.7	0.0370	0.80	5 0.83054	6 0.87547	11 0.94296	16 0.98243	23 0.94741	29 0.95123	34 0.92386	35 0.72329			
2	429.7	212.9	0.0377	0.81	4 0.78024	7 0.89584	12 1.00217	17 0.93022	24 0.99262	30 0.84996	41 0.67073	36 0.91022			
3	432.3	214.6	0.0375	0.81	3 1.47142	8 0.92031	13 1.00153	18 0.97061	25 0.98502	31 0.94105	42 0.70356	37 0.96142			
4	431.3	216.8	0.0376	0.81	2 1.59636	9 1.00535	14 0.96051	19 0.99035	26 0.97033	32 0.94614	39 0.99644	38 1.01100			
5	432.0	210.0	0.0377	0.81	1 2.89127	10 0.97909	15 1.01209	20 1.00535	27 0.99262	33 0.94359	40 0.72520	43 0.67073			
6	431.8	210.1	0.0300	0.81											

WIND TUNNEL TEST CONDITIONS..... Q 10.296 PT 90.073 PS 1.215 R/L 10.6 MACH 3.400 TEMP 103.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 431.6 TC= 215.0 PTC/PSA= 355.24 PSH(22)/PSA= 0.6647
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 550. HEATER TOTAL TEMPERATURE= 240.

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WSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 341/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	883.90	868.1	101.4	104.9	107.5	0.0	127.0	221.5
2	1.21	862.85	851.3	101.4	104.5	107.5	0.0	132.2	225.0
3	1.22	872.32	862.8	100.1	103.2	106.2	0.0	140.0	225.0
4	1.22	870.74	860.7	98.0	101.4	105.3	0.0	144.0	227.2
5	1.22	872.32	858.1	98.0	101.0	104.5	0.0	150.9	229.3
6	1.21	869.69	860.7	97.1	96.7	103.6	0.0	156.5	230.2

FR	PTC	TC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	N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WIND TUNNEL TEST CONDITIONS..... 0 10.295 PT 98.861 PS 1.215 R/L 10.6 MACH 3.488 TEMP 103.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 869.7 TC= 226.7 PTC/PSA= 715.89 PSH(22)/PSA= 0.8431
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1120. HEATER TOTAL TEMPERATURE= 358.

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23 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575

JUN 343/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.22	1582.32	1557.6	111.9	117.1	116.2	0.0	147.4	239.7
2	1.22	1558.64	1544.4	111.0	116.2	115.8	0.0	154.8	239.7
3	1.22	1541.27	1509.7	109.7	115.3	114.0	0.0	162.1	241.5
4	1.22	1502.32	1476.5	110.1	114.9	114.5	0.0	166.9	241.5
5	1.22	1456.53	1440.7	109.3	113.6	113.6	0.0	173.4	240.6
6	1.22	1401.88	1387.1	108.4	112.3	112.3	0.0	178.2	238.9

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1578.1	239.7	0.0361	1.35	5	0.84542	6	0.87916	11	0.94537	16	0.98357	23	0.94792	29	0.95301	34	0.96881	35	0.72319
2	1548.6	239.3	0.0365	1.35	4	0.79768	7	0.90817	12	1.00283	17	0.94828	24	0.99375	30	0.95847	41	1.13254	36	0.91545
3	1555.5	241.9	0.0362	1.34	3	1.49831	8	0.93288	13	1.00521	18	0.98238	25	0.99857	31	0.94283	42	1.18983	37	0.96256
4	1504.4	241.5	0.0366	1.33	2	2.59882	9	1.08458	14	0.97828	19	1.00267	26	0.97529	32	0.94792	39	1.01285	38	1.01731
5	1451.3	241.8	0.0367	1.31	1	2.97745	10	0.97975	15	1.01548	20	1.01031	27	0.99566	33	0.94410	40	1.19811	43	1.09243
6	1395.0	238.9	0.0367	1.30									21	1.61318	28	0.98039				

WIND TUNNEL TEST CONDITIONS..... 0 10.297 PT 90.886 PS 1.215 R/L 10.6 MACH 3.400 TEMP 103.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1585.5 TC= 248.4 PTC/PSA= 1238.98 PSH(22)/PSA= 1.0943
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2070. HEATER TOTAL TEMPERATURE= 270.

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23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 344/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.86	1585.48	1567.1	83.7	83.2	85.8	0.0	98.8	373.7	257.5
2	5.88	1584.43	1579.2	83.7	83.2	86.3	0.0	118.6	335.1	253.6
3	5.85	1586.81	1555.5	84.1	83.2	86.7	0.0	124.4	388.7	248.4
4	5.86	1593.98	1575.8	82.8	82.8	88.4	0.0	133.1	298.5	247.5
5	5.87	1588.11	1577.6	82.8	83.7	90.2	0.0	139.6	278.3	246.2
6	5.86	1578.98	1553.9	84.5	84.5	91.8	0.0	145.7	278.1	244.1

FR	PTC	TC	P47/PTC	PORT-22 NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO
1	1598.7	257.1	0.8365	5.28	5 0.87371	6 0.89614	11 0.93398	16 0.94626	23 0.93099	29 0.94558	34 1.02874	35 0.96612			
2	1588.2	254.5	0.8362	5.25	4 0.79122	7 0.94624	12 0.93313	17 0.92564	24 0.96917	38 0.95619	41 1.09346	36 1.15247			
3	1580.7	248.4	0.8365	5.26	3 0.97588	8 0.97986	13 0.92488	18 0.91953	25 0.93022	31 0.97918	42 1.11581	37 1.85788			
4	1593.4	248.8	0.8359	5.26	2 1.31132	9 1.88812	14 0.93175	19 0.92717	26 0.91405	32 1.83791	39 1.88831	38 1.88297			
5	1584.4	246.7	0.8361	5.28	1 1.48373	10 0.98827	15 0.99514	20 0.98383	27 0.98833	33 1.88278	40 1.11818	43 1.89860			
6	1574.4	244.9	0.8368	5.25									21 0.97375	28 0.94891	

WIND TUNNEL TEST CONDITIONS..... 0 7.743 PT 10.013 PS 5.065 R/L 5.3 MACH 1.478 TEMP 100.1
 MODEL ATTITUDE..... ALPHA 0.80 BETA 0.80 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1588.7 TC= 249.9 PTC/PSA= 312.10 PSH(22)/PSA= 1.8396
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2875. HEATER TOTAL TEMPERATURE= 250.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

100

[illegible][illegible]

WIND TUNNEL TEST CONDITIONS.....	0	7.740	PT	18.613	PS	5.033	R/L	5.3	MACH	1.402	TEMP	100.1	
MODEL ATTITUDE.....	ALPHA		0.00		BETA		0.00		ROLL		0.0		
AVERAGE MODEL/NOZZLE PARAMETERS...	PTC=		1246.9		TC=		256.9		PTC/PSA=		241.76		
									PSM(221)/PSA=		1.0078		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=						1000.						
							HEATER TOTAL TEMPERATURE=						260.

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TEST 575 RUN 34674

WIND TUNNEL TEST CONDITIONS.....	0	7.742	PT	10.015	PS	5.055	R/L	5.3	MACH	1.479	TEMP	101.7
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PGC	861.0	TC	270.0	PTC/PSA	170.34			PSH(22)/PSA	0.9888		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1300.					HEATER TOTAL TEMPERATURE= 293.						

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TEST 575 RUN 347/E

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[illegible]

WIND TUNNEL TEST CONDITIONS.....										0	7.753	PT	10.013	PS	5.205	R/L	5.3	MACH	1.459	TEMP	103.0
MODEL ATTITUDE.....										ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..										PTC=	450.0	TC=	277.7	PTC/PSA=	88.34	PSM(22)/PSA= 0.9602					
HEATER PARAMETERS.....										HEATER TOTAL PRESSURE=				400.	HEATER TOTAL TEMPERATURE=					250.	

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NS-C TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 340/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.37	869.28	855.5	116.2	121.8	120.5	0.0	148.5	287.8	237.1
2	7.38	841.31	834.5	114.0	119.2	119.7	0.0	145.7	288.1	242.3
3	7.38	851.31	841.3	115.3	118.8	118.8	0.0	152.2	275.7	242.3
4	7.37	856.85	845.8	113.2	117.1	117.9	0.0	156.1	271.8	245.4
5	7.38	868.26	858.3	112.3	117.1	118.4	0.0	168.8	278.5	247.5
6	7.38	868.15	858.2	111.8	114.9	117.5	0.0	165.2	288.8	245.7

FR	PTC	TC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	
1	865.8	237.6	0.0372	6.93	5	0.89641	6	0.99869	11	0.97246	16	1.00918	23	0.92788	29	1.03593	34	0.92421	35	1.12352
2	841.3	242.8	0.0379	6.82	4	0.77472	7	0.98243	12	0.97889	17	1.05376	24	1.08761	30	1.01652	41	0.87228	36	1.08288
3	851.8	243.6	0.0374	6.93	3	0.95568	8	0.96828	13	0.94847	18	1.01285	25	0.98945	31	0.98243	42	0.88382	37	1.02781
4	855.5	246.2	0.0375	6.93	2	1.29137	9	0.99687	14	1.00226	19	1.08551	26	1.08656	32	0.99659	39	0.87288	38	0.93889
5	858.2	247.5	0.0374	6.94	1	1.32822	10	0.97718	15	1.08446	20	1.08341	27	1.02872	33	0.99292	40	0.89274	43	0.88815
6	863.4	250.1	0.0374	6.94																

WIND TUNNEL TEST CONDITIONS..... Q 7.581 PT 10.015 PS 7.374 R/L 5.5 MACH 1.286 TEMP 181.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 855.9 TC= 244.6 PTC/PSA= 116.86 PSH(22)/PSA= 0.9399
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1188. HEATER TOTAL TEMPERATURE= 285.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 350.1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	1231.84	1210.8	112.3	117.9	117.1	0.0	135.7	287.9	242.3
2	7.40	1220.26	1202.4	111.4	116.2	117.1	0.0	143.9	280.9	248.3
3	7.40	1203.41	1178.7	111.0	115.8	116.2	0.0	150.9	276.1	248.3
4	7.41	1213.94	1198.2	109.3	114.0	115.8	0.0	156.9	272.2	252.7
5	7.41	1230.78	1211.3	110.1	113.6	115.8	0.0	162.1	270.9	255.3
6	7.41	1231.84	1215.0	109.3	112.7	115.3	0.0	166.9	270.9	258.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1236.0	242.8	0.0365	7.28	5	0.89695	6	0.99882	11	0.97322	16	1.00927	23	0.92203	29	1.03434	34	0.97166	35	1.12081		
2	1221.3	249.3	0.0365	7.26	4	0.77837	7	0.97897	12	0.96880	17	1.05315	24	1.00822	30	1.01248	41	0.97949	36	1.00891		
3	1208.2	248.4	0.0368	7.26	3	0.96225	8	0.99203	13	0.93613	18	1.00770	25	0.92725	31	0.98881	42	0.99046	37	1.02540		
4	1210.8	252.3	0.0369	7.27	2	1.28875	9	0.99898	14	1.00589	19	1.00308	26	1.00718	32	0.99986	39	0.97897	38	0.96225		
5	1235.0	255.8	0.0364	7.27	1	1.32278	10	0.98854	15	1.00822	20	0.99725	27	1.02181	33	0.99368	40	0.99725	43	0.98837		
6	1231.8	258.4	0.0367	7.29																		

WIND TUNNEL TEST CONDITIONS..... Q 7.496 PT 10.021 PS 7.404 R/L 5.5 MACH 1.203 TEMP 101.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1223.9 TC= 251.1 PTC/PSA= 165.29 PSM(22)/PSA= 0.9824
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 290.

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23 AUGUST 1973

 NSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 351/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.41	1689.69	1981.8	95.8	97.5	96.7	0.0	184.8	239.3
2	7.41	1582.85	1949.2	94.5	96.7	97.5	0.0	114.5	246.2
3	7.41	1588.64	1968.1	94.1	97.1	98.4	0.0	126.6	247.1
4	7.41	1617.06	1598.7	94.5	96.7	99.3	0.0	135.3	251.8
5	7.41	1688.11	1583.9	95.8	97.1	101.8	0.0	144.4	252.7
6	7.41	1581.27	1539.7	95.4	96.7	101.6	0.0	152.2	255.3

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1618.1	239.3	0.0368	7.77	5	0.88897	6	0.99499	11	0.96783	16	1.00544	23	0.91496	29	1.02947	34	1.03991	39	1.12480
2	1691.3	246.7	0.0361	7.73	4	0.77615	7	0.97462	12	0.98366	17	1.09148	24	1.00492	30	1.01814	41	1.07386	36	0.99761
3	1589.7	247.1	0.0363	7.74	3	0.95948	8	0.98455	13	0.93823	18	1.00178	25	0.92596	31	0.97619	42	1.00588	37	1.01982
4	1615.5	251.0	0.0360	7.74	2	1.28435	9	0.98559	14	1.00387	19	0.99978	26	1.00335	32	0.99761	39	1.07439	38	1.01902
5	1616.5	252.7	0.0360	7.76	1	1.31674	10	0.97358	15	1.00874	20	0.99552	27	1.01745	33	0.99804	40	1.00981	43	1.00178
6	1582.3	254.9	0.0362	7.72									21	0.95582	28	1.02738				

WIND TUNNEL TEST CONDITIONS..... 0 7.494 PT 10.019 PS 7.486 R/L 5.4 MACH 1.203 TEMP 102.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1603.9 TC= 248.6 PTC/PSA= 216.98 PSM(22)/PSA= 1.0458
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 280.

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--				MODEL-STING FEEDER-PIPE	TCH		
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)				
1	10.57	1593.41	1579.2	119.2	123.6	122.3	0.0	146.1	278.7	248.8
2	10.58	1574.99	1546.8	119.2	123.6	121.8	0.0	154.8	274.0	249.7
3	10.58	1571.84	1542.4	117.1	121.4	120.5	0.0	160.0	267.9	250.6
4	10.56	1589.20	1563.4	115.8	120.5	119.7	0.0	164.7	265.7	252.7
5	10.58	1573.94	1557.1	115.3	118.8	119.2	0.0	169.5	264.9	255.3
6	10.56	1548.68	1533.9	115.8	118.4	118.4	0.0	174.3	264.9	254.5

[illegible]

WIND TUNNEL TEST CONDITIONS.....	0	6.002	PT	10.013	PS	10.573	R/L	5.1	MACH	0.907	TEMP	100.9
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1574.2	TC=	292.4	PTC/PSA=	140.89	PSM1221/PSA= 1.0438					
WEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2100.					HEATER TOTAL TEMPERATURE= 280.						

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 MSFC TRISONIC WIND TUNNEL MOUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 353/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.59	1224.99	1201.0	110.6	114.0	114.0	0.0	133.5	242.3
2	10.60	1206.05	1180.7	110.1	113.2	113.2	0.0	140.9	247.1
3	10.60	1209.73	1193.3	110.6	113.2	113.6	0.0	140.7	246.2
4	10.60	1224.47	1210.3	109.7	112.3	112.7	0.0	154.3	240.4
5	10.59	1206.57	1198.3	108.4	111.0	112.3	0.0	150.7	251.9
6	10.50	1226.05	1203.0	108.0	111.0	112.7	0.0	162.6	252.7

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1227.1	242.3	0.0365	10.65	5	0.99975	6	0.98186	11	0.95995	16	0.99209	23	0.96141	29	1.01436	34	0.99975	35	1.04394
2	1202.4	247.1	0.0360	10.64	4	0.98394	7	0.96726	12	0.97054	17	1.02970	24	0.97127	30	1.00098	41	1.00231	36	1.03627
3	1208.2	246.2	0.0366	10.65	3	0.88085	8	0.99099	13	0.97638	18	1.00194	25	0.95849	31	1.00742	42	1.01526	37	1.03590
4	1217.1	240.4	0.0364	10.64	2	1.00374	9	0.98515	14	0.98150	19	1.00341	26	0.98223	32	1.00998	39	0.99391	38	1.01217
5	1207.6	251.9	0.0369	10.64	1	1.11514	10	0.96945	15	0.99537	20	1.00700	27	1.00121	33	1.01071	40	1.00012	43	1.00560
6	1226.0	253.2	0.0365	10.65																

WIND TUNNEL TEST CONDITIONS..... Q 6.073 PT 10.017 PS 10.593 R/L 5.1 MACH 0.905 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1214.7 TC= 240.2 PTC/PSA= 114.67 PSH(22)/PSA= 1.0050
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 280.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 900 0.18 354.0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--				SKIN(5)	MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)				
1	10.57	874.47	866.8	111.4	114.0	114.9	0.0	132.7	287.7	254.1
2	10.68	857.62	845.8	111.8	113.2	113.6	0.0	138.7	280.1	238.9
3	10.59	858.15	845.5	110.1	112.3	113.2	0.0	144.4	274.3	248.2
4	10.59	863.94	849.7	108.4	111.9	113.2	0.0	150.0	270.1	243.2
5	10.56	865.52	848.2	108.4	111.0	112.7	0.0	154.8	267.9	246.2
6	10.57	874.99	861.3	108.8	111.0	113.2	0.0	159.1	267.9	247.1

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	868.7	235.4	0.8372	10.15	5 0.99968	6 0.98169	11 0.95830	16 0.98462	23 0.96159	29 1.00691	34 0.95863	35 1.04163			
2	856.8	239.7	0.8374	10.15	4 0.95757	7 0.96781	12 0.96963	17 1.02336	24 0.97183	30 1.00833	41 0.94588	36 1.03830			
3	853.8	248.2	0.8374	10.15	3 0.88748	8 0.99818	13 0.97219	18 0.99883	25 0.95538	31 0.99382	42 0.95355	37 1.02592			
4	865.8	242.8	0.8372	10.16	2 1.00439	9 0.98688	14 0.97731	19 0.99883	26 0.97877	32 0.99266	39 0.93938	38 0.96896			
5	867.1	246.7	0.8374	10.16	1 1.11518	10 0.96781	15 0.98937	20 0.98827	27 0.99595	33 0.98389	40 0.94295	43 0.95063			
6	876.6	247.5	0.8371	10.17				21 0.95794	28 0.99997						

WIND TUNNEL TEST CONDITIONS..... 0 6.879 PT 10.017 PS 10.583 R/L 5.1 MACH 0.906 TEMP 181.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 864.7 TC= 242.8 PTC/PSA= 81.71 PSM(22)/PSA= 0.9594
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 280.

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MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 356/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.79	455.48	451.8	113.6	113.6	98.0	0.0	197.3	474.3
2	10.77	458.11	492.8	113.6	113.6	99.3	0.0	211.1	485.1
3	10.78	462.32	495.9	114.0	112.7	101.0	0.0	222.8	492.0
4	10.77	467.86	462.8	111.9	112.3	102.3	0.0	233.7	497.7
5	10.08	467.59	462.3	112.7	112.7	105.3	0.0	243.6	499.6
6	10.79	472.85	468.6	111.4	110.6	106.7	0.0	252.3	504.6

FR	PTC	TC	P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	455.48	474.3	0.0380	9.60	5 0.99672	6 0.98130	11 0.96086	16 0.97843	23 0.95978	29 0.97286	34 0.87514	35 1.04487			
2	458.11	485.1	0.0377	9.59	4 0.99368	7 0.96659	12 0.98767	17 1.01071	24 0.96875	30 0.98238	41 0.84716	36 1.01896			
3	462.32	492.5	0.0375	9.61	3 0.89594	8 0.98811	13 0.96982	18 0.97628	25 0.95583	31 0.97341	42 0.85397	37 1.01322			
4	467.86	498.5	0.0378	9.61	2 1.07706	9 0.98822	14 0.97233	19 0.97389	26 0.97233	32 0.96588	39 0.84573	38 0.90598			
5	467.59	499.8	0.0379	9.64	1 1.14844	10 0.97094	15 0.98960	20 0.96803	27 0.99062	33 0.94982	40 0.85883	43 0.85649			
6	472.85	505.0	0.0381	9.64											

WIND TUNNEL TEST CONDITIONS..... Q 5.995 PY 10.011 PS 10.785 R/L 5.1 MACH 0.088 TEMP 102.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 463.9 TC= 492.5 PTC/PSA= 43.02 PSH(22)/PSA= 0.8916
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 680. HEATER TOTAL TEMPERATURE= 620.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

Y-07 575 RUN 35671

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.68	461.27	456.5	128.3	128.3	112.7	0.0	227.2	745.2	481.6
2	10.70	453.38	450.2	126.2	127.0	112.7	0.0	237.6	725.3	492.5
3	10.69	458.64	455.0	123.1	124.4	111.9	0.0	248.4	706.2	498.5
4	10.70	463.38	458.6	123.1	124.0	113.2	0.0	258.8	691.0	505.0
5	10.71	469.16	464.4	121.0	122.3	114.5	0.0	266.6	677.1	507.2
6	10.70	478.11	472.8	120.1	121.4	115.8	0.0	274.4	665.0	509.4

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	461.8	481.6	0.0378	9.49	5 0.99765	6 0.98181	11 0.95317	16 0.97559	23 0.95859	29 0.99885	34 0.87398	35 1.03634			
2	452.8	492.8	0.0382	9.49	4 0.95462	7 0.96619	12 0.96221	17 1.00741	24 0.96474	30 0.98137	41 0.84324	36 1.01753			
3	457.1	499.8	0.0381	9.49	3 0.88917	8 0.98662	13 0.96474	18 0.97487	25 0.94847	31 0.97161	42 0.84939	37 1.01175			
4	462.8	505.0	0.0379	9.51	2 1.07973	9 0.98101	14 0.96944	19 0.97233	26 0.96872	32 0.96474	39 0.84324	38 0.90291			
5	469.2	507.2	0.0378	9.52	1 1.15868	10 0.96546	15 0.98181	20 0.96619	27 0.98608	33 0.94666	40 0.84650	43 0.85337			
6	479.2	511.1	0.0376	9.53				21 0.95389	28 0.98861						

WIND TUNNEL TEST CONDITIONS..... 0 6.813 PT 18.819 PS 18.697 R/L 5.1 MACH 0.896 TEMP 102.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 463.8 TC= 499.3 PTC/PSA= 43.36 PSM(22)/PSA= 0.8805
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 638.

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575 RUN 35710

WIND TUNNEL TEST CONDITIONS.....	Q	6.845	PT	10.011	PS	10.634	R/L	5.1	MACH	0.901	TEMP	104.0
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	830.3	TC=	506.6	PTC/PSA=	70.03	PSM(22)/PSA=	0.9520				
HEATER PARAMETERS.....	HEATER TOTAL	PRESSURE=	1100.	HEATER TOTAL	TEMPERATURE=	420.						

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 390.0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.63	1219.69	1207.1	124.0	120.5	108.0	0.0	220.2	518.5
2	10.63	1190.74	1181.3	122.3	119.2	108.8	0.0	241.5	524.5
3	10.62	1214.53	1203.9	121.8	119.2	109.7	0.0	261.4	528.4
4	10.64	1236.01	1226.0	122.3	119.2	112.3	0.0	277.0	532.8
5	10.65	1256.01	1243.9	119.2	117.1	113.6	0.0	290.9	535.8
6	10.64	1257.06	1239.7	119.2	117.1	115.3	0.0	303.0	538.8

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1219.7	518.9	0.8367	10.68	5 0.99721	6 0.97976	11 0.95939	16 0.99067	23 0.95975	29 1.01030	34 0.99576	35 1.04304			
2	1190.7	524.5	0.8373	10.66	4 0.93248	7 0.96466	12 0.96848	17 1.02667	24 0.96466	30 1.00558	41 1.00048	36 1.03103			
3	1214.5	528.4	0.8367	10.67	3 0.80774	8 0.98739	13 0.97357	18 0.99038	25 0.95502	31 1.00303	42 1.01212	37 1.03750			
4	1234.4	532.3	0.8365	10.70	2 1.00231	9 0.97976	14 0.98085	19 1.00267	26 0.98012	32 1.00739	39 0.99539	38 1.01503			
5	1252.3	535.8	0.8365	10.71	1 1.15650	10 0.96848	15 0.99503	20 1.00776	27 0.99976	33 1.01067	40 1.00303	43 1.01030			
6	1259.7	538.8	0.8360	10.73				21 0.97794	28 1.00412						

WIND TUNNEL TEST CONDITIONS..... 0 6.837 PT 18.000 PS 18.636 R/L 5.1 MACH 0.901 TEMP 102.4
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1228.9 TC= 529.8 PTC/PSA= 115.54 PSM(22)/PSA= 1.0052
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 600.

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 NSFC TRIBONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 359/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.61	1526.33	1501.8	90.2	89.7	88.9	0.0	110.1	508.5
2	10.62	1500.74	1482.3	90.2	90.2	90.6	0.0	144.0	517.2
3	10.64	1494.95	1475.5	91.0	90.6	92.8	0.0	179.0	510.0
4	10.64	1507.06	1487.6	91.9	91.5	95.4	0.0	207.2	521.9
5	10.63	1509.17	1480.1	91.9	92.3	90.0	0.0	231.1	526.7
6	10.62	1500.22	1480.1	92.5	92.8	101.0	0.0	251.0	527.1

FR	PTC	TC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	
1	1537.6	509.4	0.0362	10.99	5	0.99391	6	0.97644	11	0.95679	16	0.99428	23	0.95715	29	1.01538	34	1.02776	35	1.04450
2	1497.1	517.2	0.0364	10.97	4	0.98170	7	0.96989	12	0.96844	17	1.03205	24	0.96625	30	1.01393	41	1.03467	36	1.03613
3	1501.8	518.0	0.0364	11.00	3	0.88764	8	0.98045	13	0.97600	18	1.00774	25	0.93715	31	1.01502	42	1.05032	37	1.04741
4	1500.7	522.0	0.0365	10.99	2	1.00490	9	0.98117	14	0.98481	19	1.01357	26	0.98445	32	1.02230	39	1.02921	38	1.04341
5	1513.9	527.0	0.0365	11.00	1	1.15459	10	0.96807	15	0.99901	20	1.02121	27	1.00447	33	1.02921	40	1.03722	43	1.04006
6	1497.0	527.6	0.0367	10.99																

WIND TUNNEL TEST CONDITIONS..... 0 0.045 PT 10.007 PS 10.620 R/L 5.1 MACH 0.902 TEMP 102.6
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1500.1 TC= 520.4 PTC/PSA= 141.90 PSH(22)/PSA= 1.0341
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 615.

NSFC TRISONIC WIND TUNNEL MONTISVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--				SKIN(5) MODEL-STING FEEDER-PIPE	TCH		
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)				
							0.0	207.2	712.2	532.8
1	10.62	1577.59	1568.6	119.2	121.4	112.7	0.0	234.5	679.3	540.6
2	10.65	1586.53	1576.5	118.4	120.5	113.2	0.0	258.4	657.2	547.1
3	10.65	1598.64	1578.1	117.5	120.1	114.0	0.0	288.5	642.0	552.3
4	10.65	1584.95	1564.4	117.9	119.2	114.5	0.0	296.1	632.9	553.2
5	10.65	1614.95	1608.1	117.1	118.4	117.1	0.0	312.6	626.9	553.6
6	10.64	1591.27	1577.6	118.4	118.6	119.2	0.0			

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1572.3	532.8	0.0365	11.05	5 0.99676	6 0.98848	11 0.95787	16 0.99712	23 0.95969	29 1.01674	34 1.03418	35 1.04436			
2	1581.3	540.6	0.0361	11.06	5 0.95388	7 0.96514	12 0.97039	17 1.03418	24 0.96696	30 1.01638	41 1.04181	36 1.03636			
3	1602.8	547.5	0.0359	11.07	3 0.88847	8 0.99021	13 0.97758	18 1.01093	25 0.95933	31 1.01819	42 1.05962	37 1.04872			
4	1585.8	552.7	0.0367	11.10	2 1.08578	9 0.98585	14 0.98585	19 1.01856	26 0.98585	32 1.02692	39 1.03963	38 1.05163			
5	1606.5	554.5	0.0355	11.12	1 1.15664	10 0.97205	15 1.00184	20 1.02728	27 1.00657	33 1.03636	40 1.05199	43 1.04908			
6	1598.6	554.5	0.0363	11.10				21 0.99457	28 1.01020						

WIND TUNNEL TEST CONDITIONS..... Q 6.849 PY 10.825 PS 10.644 R/L 5.1 NACH 8.981 TEMP 102.4
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.08 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1591.1 TC= 547.1 PTC/PSA= 149.48 PSH(22)/PSA= 1.0413
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2180. HEATER TOTAL TEMPERATURE= 649.

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TEST 575 RUN 360/0

WIND TUNNEL TEST CONDITIONS..... Q 7.585 PT 18.889 PS 7.348 R/L 5.5 MACH 1.288 TEMP 101.4
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1607.5 TC= 554.8 PTC/PSA= 218.76 PSM(22)/PSA= 1.8586
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2108. HEATER TOTAL TEMPERATURE= 640.

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MSFC TRISONIC WIND TUNNEL, HANCOCK, ALABAMA
PLUME TECHNOLOGY TEST, NON-QUIESCENT PHASE

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TC
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.37	1578.64	1560.7	119.7	125.3	114.9	8.0	209.4	532.3
2	7.37	1557.06	1541.8	118.8	123.1	115.8	0.0	234.5	541.1
3	7.37	1574.95	1568.6	116.6	121.8	117.5	0.0	262.7	548.4
4	7.38	1588.64	1570.2	114.0	119.2	119.2	0.0	261.4	554.9
5	7.37	1613.38	1606.5	113.2	117.9	122.7	0.0	296.3	557.5
6	7.39	1594.95	1579.2	114.5	117.5	125.7	0.0	314.7	558.4

FR	PTC	TC	P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1581.8	533.2	0.0363	8.86	5 1.17041	6 1.15414	11 0.98364	16 1.09591	23 0.98574	29 1.10168	34 1.19034	35 1.22182			
2	1562.8	541.9	0.0364	8.85	4 0.98050	7 1.03453	12 1.09066	17 1.13473	24 0.99389	30 1.08437	41 1.21532	36 1.11899			
3	1572.3	548.0	0.0364	8.87	3 0.88817	8 1.03453	13 1.15939	18 1.07238	25 1.08070	31 1.08542	42 1.23179	37 1.10798			
4	1590.2	554.5	0.0364	8.89	2 1.43533	9 1.01669	14 1.12896	19 1.08437	26 1.11480	32 1.09486	39 1.21919	38 1.21395			
5	1610.2	557.5	0.0363	8.92	1 1.43271	10 0.99151	15 1.13001	20 1.10011	27 1.13001	33 1.13263	40 1.23965	43 1.23021			
6	1595.0	550.8	0.0365	8.90				21 1.10378	28 1.11270						

WIND TUNNEL TEST CONDITIONS..... Q 7.583 PT 10.819 PS 7.373 R/L 5.5 MACH 1.286 TEMP 101.6
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.08 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1585.4 TC= 549.0 PTC/PSA= 215.02 PSM(22)/PSA= 1.2046
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 643.

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 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 388/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.36	1605.48	1597.1	148.5	148.7	148.8	8.0	218.5	714.8	529.7
2	7.48	1569.17	1558.4	138.3	146.5	139.6	8.0	242.3	679.3	539.3
3	7.36	1578.64	1556.5	136.1	143.5	140.5	8.0	265.3	655.9	545.8
4	7.36	1611.27	1599.2	136.1	142.2	140.9	8.0	287.8	648.7	552.7
5	7.39	1626.81	1611.8	133.5	148.8	143.1	8.0	383.5	631.2	554.9
6	7.38	1621.88	1614.4	133.5	138.7	143.9	8.0	328.4	624.7	555.8

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1603.9	529.7	0.8362	8.75	5	0.96799	6	0.97771	11	1.01233	16	1.08628	23	1.06897	29	1.09468	34	1.17448	35	1.15685
2	1569.2	539.7	0.8366	8.72	4	0.82455	7	1.06897	12	1.01075	17	1.13586	24	1.07882	30	1.08419	41	1.19696	36	1.11383
3	1585.8	545.8	0.8366	8.75	3	0.96048	8	1.12098	13	1.08788	18	1.10359	25	1.08026	31	1.08261	42	1.21479	37	1.12615
4	1609.2	553.2	0.8365	8.78	2	1.31917	9	1.12248	14	1.00393	19	1.10517	26	1.06886	32	1.08943	39	1.20228	38	1.17912
5	1622.8	554.5	0.8364	8.88	1	1.41673	10	1.06216	15	1.06688	20	1.10569	27	1.08838	33	1.11828	40	1.21951	43	1.21217
6	1628.7	556.6	0.8362	8.79																

WIND TUNNEL TEST CONDITIONS..... 0 7.582 PT 10.817 PS 7.374 R/L 5.4 MACH 1.206 TEMP 102.8
 MODEL ATTITUDE..... ALPHA 8.82 BETA 8.80 ROLL 8.8
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1601.8 TC= 546.6 PTC/PSA= 217.21 PSH(22)/PSA= 1.1886
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2180. HEATER TOTAL TEMPERATURE= 645.

NSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 3517

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.32	1207.59	1197.1	111.4	108.0	104.5	0.0	227.2	529.3
2	7.32	1205.48	1190.2	109.7	106.7	105.8	0.0	250.1	536.2
3	7.32	1235.48	1220.2	109.3	106.2	109.3	0.0	269.6	543.6
4	7.32	1227.59	1220.2	108.4	106.2	111.9	0.0	289.2	549.7
5	7.32	1253.38	1235.0	108.8	105.8	115.8	0.0	304.8	551.4
6	7.32	1269.69	1259.2	108.4	105.3	118.8	0.0	318.6	556.6

FR	PTC	TC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1205.8	529.3	0.0370	7.23	5	0.89881	6	0.99512	11	0.97399	16	0.99678	23	0.94283	29	1.02734	34	0.97663	35	1.11713	
2	1208.1	537.1	0.0368	7.23	4	0.77697	7	0.98402	12	0.98719	17	1.05533	24	1.08384	38	1.02153	41	0.98588	36	1.01572	
3	1237.1	544.1	0.0362	7.24	3	0.94916	8	0.97248	13	0.95128	18	1.02364	25	0.93860	31	0.99248	42	0.99881	37	1.02153	
4	1223.9	550.1	0.0371	7.26	2	1.29777	9	0.99934	14	0.99617	19	1.01398	26	0.99459	32	0.97716	39	0.99353	38	0.96871	
5	1258.1	551.4	0.0367	7.30	1	1.37013	10	0.98350	15	1.01896	20	1.08198	27	1.03315	33	0.99987	40	1.01624	43	1.00462	
6	1268.1	556.2	0.0368	7.31																	

WIND TUNNEL TEST CONDITIONS..... 0 7.589 PT 18.884 PS 7.323 R/L 5.4 MACH 1.011 TEMP 102.1
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.08 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1233.4 TC= 544.7 PTC/PSA= 168.42 PSH(22)/PSA= 0.9918
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1688. HEATER TOTAL TEMPERATURE= 630.

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 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 362/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.74	834.95	826.5	107.5	118.6	107.1	8.8	104.7	714.4	588.7
2	7.74	834.95	826.5	106.7	109.3	108.8	8.8	205.9	688.8	589.8
3	7.74	846.53	838.6	107.1	109.7	111.4	8.8	226.3	668.9	517.6
4	7.74	853.90	846.8	108.8	110.1	114.5	8.8	244.9	654.6	923.7
5	7.75	872.32	865.8	105.8	108.4	115.8	8.8	261.4	641.6	528.8
6	7.77	879.16	868.6	107.1	108.8	119.2	8.8	276.6	632.9	538.6

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	832.8	499.8	0.8372	7.16	5	0.98386	6	1.01173	11	0.94481	16	0.98726	23	0.93833	29	0.99674	34	0.98836	35	1.12988
2	835.8	518.7	0.8372	7.16	4	0.88899	7	0.93482	12	0.96528	17	1.02121	24	0.97227	30	0.97128	41	0.86842	36	1.01123
3	843.4	517.6	0.8372	7.17	3	0.96379	8	0.95430	13	1.02721	18	0.98476	25	0.97477	31	0.96279	42	0.87398	37	1.00174
4	853.9	524.1	0.8373	7.20	2	1.26191	9	0.98626	14	1.00374	19	0.97227	26	1.00823	32	0.97727	39	0.86441	38	0.93432
5	869.2	528.4	0.8370	7.19	1	1.36977	10	0.98376	15	1.02920	20	0.97777	27	1.01722	33	0.97527	40	0.80588	43	0.87939
6	877.6	531.0	0.8371	7.21																
												</								

WIND TUNNEL TEST CONDITIONS..... 0 7.392 PT 10.817 PS 7.746 R/L 5.4 MACH 1.168 TEMP 102.5
 MODEL ATTITUDE..... ALPHA 8.82 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 852.0 TC= 518.6 PTC/PSA= 109.99 PSM(22)/PSA= 0.9269
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 628.

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					TCH		
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.49	452.32	448.1	106.2	107.1	103.6	0.0	170.4	756.9	462.1
2	7.48	446.53	441.3	104.9	106.7	104.5	0.0	182.5	734.4	475.8
3	7.50	447.06	443.4	104.9	106.2	106.7	0.0	197.7	714.9	483.4
4	7.47	453.98	451.3	104.5	105.8	108.0	0.0	212.4	696.6	490.3
5	7.49	457.59	453.9	104.5	105.3	110.6	0.0	223.7	681.5	495.1
6	7.50	468.64	462.3	105.8	105.8	113.2	0.0	235.8	668.5	497.7

[illegible]

WIND TUNNEL TEST CONDITIONS.....		Q	7.467	PF	10.011	PS	7.487	R/L	5.4	MACH	1.104	TEMP	103.2
MODEL ATTITUDE.....		ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..		PTC=	453.7	TC=	483.8	PTC/PSA=	60.60	PSN(22)/PSA=		0.9115			
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE=				400.	HEATER TOTAL TEMPERATURE=		620.				

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 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 Run 363/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.36	446.01	441.3	121.4	139.6	143.9	0.0	228.9	736.5	475.6
2	7.38	442.85	438.1	119.7	136.6	142.2	0.0	238.4	715.7	485.1
3	7.34	442.32	438.1	117.5	134.4	141.3	0.0	248.8	697.5	491.6
4	7.35	450.74	446.8	115.8	132.7	140.5	0.0	257.1	681.8	496.4
5	7.34	455.48	451.8	115.3	130.5	140.5	0.0	265.7	668.9	499.8
6	7.35	461.80	456.5	114.5	128.3	140.5	0.0	272.2	656.8	502.0

FR	PTC	TC P47/PTC	PORT-22 NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO
1	445.5	475.1	0.0382	7.33	5 0.98689	6 0.97896	11 1.01420	16 1.09205	23 1.07312	29 1.09784	34 0.97843	35 1.16307			
2	441.8	484.7	0.0382	7.32	4 0.82272	7 1.06182	12 1.01210	17 1.13762	24 1.07207	30 1.08679	41 0.88168	36 1.11257			
3	441.8	491.6	0.0382	7.32	3 0.99844	8 1.11888	13 1.08947	18 1.18521	25 1.08210	31 1.08259	42 0.88957	37 1.12738			
4	451.3	495.9	0.0379	7.33	2 1.31562	9 1.12389	14 0.99737	19 1.10836	26 1.05628	32 1.08679	39 0.79888	38 1.02893			
5	453.9	500.3	0.0380	7.34	1 1.41828	10 1.06891	15 1.04839	20 1.09837	27 1.08627	33 1.08259	40 0.81746	43 0.81168			
6	468.7	502.8	0.0378	7.33				21 1.04313	28 1.10258						

WIND TUNNEL TEST CONDITIONS..... 0 7.500 PT 10.017 PS 7.353 R/L 5.4 MACH 1.208 TEMP 102.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 449.2 TC= 491.6 PTC/PSA= 61.89 PSH(22)/PSA= 0.9968
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 500. HEATER TOTAL TEMPERATURE= 640.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TES 575 RUN 344/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.15	454.43	447.1	107.5	112.3	115.3	0.0	192.5	680.2	449.5
2	5.17	456.53	450.2	106.7	111.0	114.5	0.0	205.5	661.5	459.1
3	5.15	457.59	451.3	104.9	110.1	115.3	0.0	217.2	647.2	466.6
4	5.13	460.22	450.7	105.3	109.3	116.2	0.0	227.2	633.4	472.1
5	5.13	472.32	465.0	104.0	108.8	117.5	0.0	236.7	622.9	476.4
6	5.14	474.95	466.0	104.9	108.8	119.2	0.0	244.9	612.5	479.9

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	454.4	449.1	0.0376	4.99	5	0.86170	6	0.89899	11	0.98243	16	0.91252	23	0.95762	29	0.93507	34	0.95912	35	0.96363									
2	456.0	459.5	0.0376	4.99	4	0.79158	7	0.95161	12	0.94860	17	0.93783	24	1.00122	30	0.98617	41	0.77497	36	1.13877									
3	456.0	466.5	0.0378	4.98	3	1.02527	8	0.98618	13	0.94635	18	0.92304	25	0.92304	31	1.02302	42	0.78324	37	1.06361									
4	460.2	471.7	0.0379	4.99	2	1.33796	9	0.99376	14	0.96589	19	0.96664	26	0.91027	32	1.02076	39	0.76971	38	1.07714									
5	470.2	476.0	0.0376	4.98	1	1.39735	10	0.98468	15	0.96965	20	0.95762	27	0.93582	33	1.00197	40	0.79153	43	1.78098									
6	475.5	479.9	0.0377	5.00																									

WIND TUNNEL TEST CONDITIONS..... 0 7.763 PT 10.046 PS 5.146 R/L 5.3 MACH 1.468 TEMP 106.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 462.1 TC= 467.1 PTC/PSA= 89.79 PSM(22)/PSA= 0.9696
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 545.

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 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST, NON-QUIESCENT PHASE

TEST 575 RUN 364/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	4.95	466.01	458.6	159.5	178.2	179.0	0.0	228.2	664.9	465.2
2	4.97	459.69	456.0	157.8	176.0	177.3	0.0	229.3	669.8	473.4
3	5.03	463.38	457.1	153.0	178.8	173.0	0.0	239.3	654.6	482.1
4	4.95	465.48	456.9	151.7	168.6	171.7	0.0	248.8	642.9	486.4
5	5.05	477.59	468.1	148.7	165.6	170.8	0.0	254.5	632.9	498.3
6	5.06	479.16	475.5	147.4	163.0	169.5	0.0	263.1	624.7	493.6

FR	PTC	TC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	
1	465.8	464.7	0.0376	5.21	5	0.92716	6	0.98473	11	0.95886	16	0.98593	23	0.93489	29	0.98979	34	1.02459	35	0.94185
2	458.1	473.8	0.0381	5.22	4	0.81583	7	0.98283	12	0.95422	17	1.08998	24	0.95964	30	1.09109	41	0.86487	36	1.22332
3	462.3	481.6	0.0381	5.23	3	1.01067	8	0.99289	13	0.90241	18	0.97587	25	0.93721	31	1.16888	42	0.87388	37	1.09885
4	469.7	486.4	0.0378	5.22	2	1.35865	9	1.00603	14	0.92329	19	1.03464	26	0.91788	32	1.10581	39	0.85447	38	1.20898
5	480.2	489.9	0.0376	5.28	1	1.43907	10	0.98902	15	1.02768	20	1.07485	27	0.95732	33	1.12125	40	0.88540	43	0.88695
6	477.1	492.9	0.0381	5.31																

WIND TUNNEL TEST CONDITIONS..... Q 7.739 PT 18.019 PS 5.002 R/L 5.3 MACH 1.487 TEMP 104.8
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 468.7 TC= 481.4 PTC/PSA= 93.71 PSM(221)/PSA= 1.0488
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 615.

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST., NON-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.03	834.43	818.6	138.3	154.8	154.3	8.0	204.6	662.8	485.1
2	5.01	836.81	826.0	137.9	153.5	152.2	8.0	222.6	642.5	493.8
3	5.03	827.86	889.7	136.1	150.9	153.0	8.0	238.9	627.3	506.7
4	5.03	816.53	839.5	134.8	147.8	153.0	8.0	253.2	615.6	505.9
5	5.03	855.48	839.7	132.2	145.7	152.2	8.0	265.7	606.0	509.8
6	5.00	872.85	860.2	130.9	143.5	153.0	8.0	276.1	599.5	514.6

[illegible]

WIND TUNNEL TEST CONDITIONS..... Q 7.744 PT 18.927 RS 5.023 R/L 5.2 MACH 1.484 TEMP 186.2
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 845.9 TC= 581.5 PTC/PSA= 168.48 PSN(22)/PSA= 0.9737
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 485.

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 366/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	4.97	1197.59	1175.0	137.0	151.3	151.7	0.0	265.3	518.5
2	4.97	1207.86	1187.6	137.9	150.4	151.3	0.0	281.8	523.7
3	4.97	1212.32	1200.7	135.7	146.5	151.7	0.0	294.4	529.7
4	4.99	1244.95	1233.4	134.8	144.4	151.7	0.0	306.1	534.5
5	4.97	1248.11	1231.0	131.4	142.2	152.2	0.0	317.3	536.7
6	4.97	1270.22	1256.5	129.2	140.0	152.2	0.0	326.4	541.0

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1204.4	518.0	0.0367	5.00	5	0.85332	6	0.87120	11	0.94114	16	0.96135	23	0.91930	29	0.94503	34	1.00254	35	0.97376
2	1209.7	524.1	0.0368	5.02	4	0.82885	7	0.95288	12	0.95435	17	0.93801	24	0.97223	30	0.96912	41	1.02741	36	1.13077
3	1213.4	529.7	0.0370	5.01	3	1.00409	8	0.98155	13	0.92793	18	0.94891	25	0.94114	31	0.98099	42	1.05383	37	1.06316
4	1243.9	534.5	0.0366	5.03	2	1.32117	9	1.02352	14	0.93493	19	0.92793	26	0.91472	32	1.02818	39	1.03518	38	1.05772
5	1245.0	537.1	0.0370	5.05	1	1.42376	10	0.96213	15	0.95746	20	0.97611	27	0.94037	33	1.04217	40	1.07093	43	1.03362
6	1266.0	541.0	0.0367	5.03																
																		</		

WIND TUNNEL TEST CONDITIONS..... Q 7.730 PT 10.023 PS 4.977 R/L 5.2 MACH 1.491 TEMP 105.1
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1230.4 TC= 530.8 PTC/PSA= 247.21 PSM(22)/PSA= 1.0093
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 610.

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WIND TUNNEL TEST CONDITIONS.....		Q	7.746	PI	18.036	PS	5.003	R/L	5.2	MACH	1.087	TEMP	107.6
MODEL ATTITUDE.....		ALPHA	0.02	BETA	0.00		ROLL	0.0					
AVERAGE MODEL/NOZZLE PARAMETERS..		PTC	1590.0	TC	520.2		PTC/PSA	317.70		PSM(22)/PSA	1.0513		
HEATER PARAMETERS.....		HEATER TOTAL PRESSURE= 2100.						HEATER TOTAL TEMPERATURE= 610.					

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT				MODEL	STING	FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)				
1	4.82	1568.74	1539.2	188.8	114.0	112.7	8.0	164.7	671.5	511.1
2	4.86	1551.27	1533.9	187.1	112.7	114.0	8.0	192.9	644.2	519.3
3	4.84	1571.27	1546.5	187.1	112.7	114.0	8.0	221.1	626.0	538.2
4	4.87	1577.59	1552.3	188.0	111.9	115.3	8.0	244.5	615.1	537.1
5	4.85	1601.27	1572.8	187.5	111.4	119.2	8.0	261.8	689.5	539.3
6	4.83	1581.27	1562.3	186.7	119.6	120.5	8.0	289.1	685.6	543.2

[illegible]

WIND TUNNEL TEST CONDITIONS..... Q 7.719 PT 18.017 PS 4.847 R/L 5.2 MACH 1.589 TEMP 105.2
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1576.9 TC= 530.3 PTC/PSA= 325.33 PSM(221)/PSA= 1.1767
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2890. HEATER TOTAL TEMPERATURE= 630.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 370/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE			TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)				
1	1.21	858.68	16.0	96.7	96.7	100.1	0.0	140.0	544.1	492.5	
2	1.21	843.41	17.6	95.4	96.7	99.7	0.3	169.1	557.9	449.0	
3	1.21	842.36	15.0	94.5	96.2	99.7	0.0	197.3	566.2	506.6	
4	1.21	849.73	15.5	94.5	95.4	.6	0.0	222.0	572.2	512.0	
5	1.21	861.84	14.5	94.1	95.8	.4	0.0	244.1	576.6	515.0	
6	1.21	872.36	16.6	94.1	95.8	103.2	0.0	262.3	579.2	518.0	

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	855.0	491.2	0.0360	1.00	5 0.82825	6 0.85565	11 0.93274	16 0.96985	23 0.93401	29 0.93592	34 0.91235	35 0.71994			
2	842.9	499.0	0.0373	1.00	4 0.78429	7 0.87467	12 0.98371	17 0.94612	24 0.96459	30 0.93592	41 0.83988	36 0.90789			
3	843.4	506.3	0.0373	1.01	3 1.47365	8 0.91188	13 0.98817	18 0.96714	25 0.97861	31 0.92828	42 0.88623	37 0.94866			
4	858.3	512.0	0.0373	1.02	2 2.57331	9 0.98825	14 0.96077	19 0.98434	26 0.96396	32 0.93210	39 0.98371	38 1.01747			
5	862.4	514.6	0.0372	1.03	1 2.96832	10 0.96523	15 1.00155	20 0.99135	27 0.90434	33 0.93019	40 0.92509	43 0.85246			
6	870.8	510.0	0.0372	1.03					21 1.78956	28 0.97833					

WIND TUNNEL TEST CONDITIONS..... 0 10.209 PT 90.815 PS 1.214 R/L 10.5 MACH 3.480 TEMP 105.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 856.1 TC= 506.8 PTC/PSA= 783.43 PSM(22)/PSA= 0.8399
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1200. HEATER TOTAL TEMPERATURE= 625.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 372/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.64	9.16	9.7	90.2	88.4	88.4	0.0	80.6	36.9
2	10.62	9.16	9.7	89.7	88.9	88.9	0.0	81.5	38.2
3	10.63	9.16	9.7	89.3	88.9	89.3	0.0	81.5	37.3
4	10.65	9.16	9.7	89.3	89.3	89.3	0.0	81.1	36.9
5	10.63	9.16	9.7	89.7	89.7	89.7	0.0	81.9	36.9
6	10.64	9.16	9.7	90.2	90.2	90.2	0.0	82.4	37.3

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	10.2	85.0	0.9554	10.08	5	0.99648	6	0.97866	11	0.95612	16	0.97757	23	0.95939	29	0.99903	34	0.91866	35	1.04231	
2	9.2	85.0	1.0578	10.06	4	0.95866	7	0.96448	12	0.96157	17	1.01249	24	0.94266	30	0.98638	41	0.98375	36	1.02194	
3	9.2	86.3	1.0578	10.09	3	0.88193	8	0.98376	13	0.96557	18	0.97939	25	0.94775	31	0.97866	42	0.89829	37	1.01467	
4	9.2	87.1	1.0651	10.09	2	1.07940	9	0.97866	14	0.97321	19	0.97976	26	0.97248	32	0.97757	39	0.93539	38	0.93582	
5	9.2	86.7	1.0651	10.08	1	1.15869	10	0.96303	15	0.98339	20	0.97575	27	0.98885	33	0.96339	40	0.91466	43	0.90193	
6	9.2	87.1	1.0651	10.09																	

WIND TUNNEL TEST CONDITIONS..... Q 6.038 PT 10.002 PS 10.636 R/L 5.1 MACH 0.901 TEMP 103.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 9.3 TC= 86.3 PTC/PSA= 0.88 PSM(22)/PSA= 0.9481
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

PT 513 RUN 113

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	4.95	6.0	76.7	74.6	76.3	0.0	66.8	30.8	67.2
2	7.46	4.95	6.8	78.0	75.4	77.6	0.0	67.6	30.8	67.4
3	7.42	4.95	5.5	79.8	76.7	78.5	0.0	68.9	31.7	67.5
4	7.42	4.95	6.8	79.8	78.0	79.8	0.0	68.5	31.2	67.6
5	7.43	4.95	6.0	80.2	78.0	80.6	0.0	68.9	30.8	69.4
6	7.44	4.95	6.0	81.5	79.3	81.5	0.0	69.8	31.7	69.4

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	5.2	69.4 1.2369	6.78	5	0.89664	6	0.98938	11	0.96438	16	1.08448	23	0.91023	29	1.03268	34	0.89408	35	1.12997
2	5.2	68.9 1.2504	6.79	4	0.88887	7	0.96855	12	0.95813	17	1.05838	24	1.01333	30	0.99771	41	0.74359	36	0.99258
3	5.5	69.4 1.1181	6.78	3	0.95553	8	0.99719	13	0.93366	18	0.99927	25	0.91780	31	0.96846	42	0.73422	37	1.02374
4	5.5	69.4 1.1303	6.78	2	1.28463	9	0.98209	14	1.08684	19	1.08344	26	1.00552	32	0.99302	39	0.73839	38	0.93314
5	5.5	70.7 1.1303	6.77	1	1.36690	10	0.97115	15	1.00788	20	0.99842	27	1.01593	33	0.98104	40	0.73422	43	0.77015
6	5.5	71.5 1.1181	6.79							21	0.94355	28	1.03183						

WIND TUNNEL TEST CONDITIONS..... Q 7.428 PT 18.084 PS 7.428 R/L 5.4 MACH 1.280 TEMP 102.7
 MODEL ATTITUDE..... ALPHA 8.00 BETA 0.00 ROLL 8.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 5.3 TC= 69.9 PTC/PSA= 0.71 PSM(22)/PSA= 0.9132
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

A-193

23 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 37470

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TC	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.18	4.95	3.4	126.2	131.8	127.5	8.0	183.4	718.3	285.1
2	5.15	4.95	2.8	123.6	128.8	125.7	8.0	181.6	717.5	284.6
3	5.15	4.95	3.4	123.1	127.9	124.4	8.0	179.9	717.5	283.3
4	5.16	4.95	3.4	120.5	125.7	123.1	8.0	178.6	717.5	282.8
5	5.16	4.43	3.4	117.9	124.4	121.0	8.0	176.4	717.8	282.5
6	5.18	4.43	3.4	117.1	122.7	120.1	8.0	175.6	717.9	281.4

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	5.5	285.5	0.7593	4.97	5	0.87551	6	0.98897	11	0.97886	16	0.92194	23	0.95115	29	0.94591	34	0.95564	35	0.96688	
2	5.5	285.5	0.7654	4.97	4	0.79387	7	0.94441	12	0.94866	17	0.98396	24	1.08432	30	0.97382	41	0.71374	36	1.13464	
3	5.0	283.3	0.8332	4.96	3	1.01631	8	0.99758	13	0.95115	18	0.92269	25	0.93317	31	1.02885	42	0.78999	37	1.06424	
4	4.4	282.5	0.9323	4.97	2	1.33835	9	0.99009	14	0.95265	19	0.95714	26	0.90996	32	1.01855	39	0.71299	38	1.88146	
5	5.0	283.3	0.8332	4.97	1	1.40575	10	0.98785	15	0.94815	20	0.98268	27	0.94366	33	1.01406	40	0.78849	43	0.74744	
6	5.0	282.8	0.8332	4.97								21	0.97586	28	0.93617						

WIND TUNNEL TEST CONDITIONS..... Q 7.751 PT 18.013 PS 9.165 R/L 5.3 MACH 1.464 TEMP 104.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 5.0 TC= 283.7 PTC/PSA= 0.98 PSM(22)/PSA= 0.9821
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 610.

23 AUGUST 1973

MSFC TRISONIC WIND TUNNEL PORTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

Test 575 RUN 375/0

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OF POOR QUALITY

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.22	0.28	-71.3	78.0	78.9	80.2	8.8	78.5	116.6
2	1.22	0.28	-71.8	78.0	79.3	79.8	8.8	78.5	116.6
3	1.21	0.88	-71.3	78.0	78.9	79.8	0.0	78.5	116.2
4	1.22	0.88	-70.8	79.8	79.3	80.2	0.0	78.9	116.6
5	1.22	0.28	-71.3	78.5	78.9	80.2	0.0	79.3	117.1
6	1.21	0.28	-72.4	77.2	78.0	79.3	8.8	78.5	116.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	0.3	86.3 2.8880	1.19	5 0.82262	6 0.86464	11 0.94041	16 0.97224	23 0.93859	29 0.94678	34 1.28550	35 0.73157				
2	0.8	87.1 0.6477	1.19	4 0.76914	7 0.88884	12 0.98880	17 0.98221	24 0.96588	38 0.94168	41 0.28843	36 0.91112				
3	0.8	87.6 0.7389	1.19	3 1.45232	8 0.91685	13 0.98080	18 0.96524	25 0.97734	31 3.81958	42 0.24831	37 0.95378				
4	0.8	87.6 0.6893	1.19	2 2.53917	9 0.93367	14 0.96142	19 0.98753	26 0.96878	32 0.99262	39 0.24831	38 0.99262				
5	0.8	87.6 0.6893	1.19	1 2.59874	10 0.96842	15 1.00217	20 0.99262	27 0.97798	33 3.81958	40 0.24577	43 0.28996				
6	0.8	86.7 0.6893	1.19					21 0.98498	28 0.96397						

WIND TUNNEL TEST CONDITIONS..... 0 10.296 PT 98.873 PS 1.215 R/L 18.3 MACH 3.488 TEMP 112.5
 MODEL ATTITUDE..... ALPHA 0.88 BETA 0.80 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 0.7 TC= 87.1 PTC/PSA= 0.59 PSM1221/PSA= 0.9886
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1995. HEATER TOTAL TEMPERATURE= 640.

A-195

25 AUGUST 1973

MSFC TRISONIC WIND TUNNEL MONTGOMERY, ALABAMA
PLUME TECHNOLOGY TEST.....INCREASING PRESSURE

TEST 475 RUN 3-1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE		TC
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	0.26	17.6	108.4	114.5	119.2	0.0	138.3	329.9	143.5
2	1.21	0.26	17.8	107.5	113.1	117.9	0.0	137.9	329.0	142.6
3	1.21	0.26	14.5	107.1	112.7	116.2	0.0	138.7	329.0	143.1
4	1.21	0.26	14.5	110.1	111.9	115.3	0.0	138.3	329.9	142.6
5	1.21	0.26	14.5	104.0	109.7	114.9	0.0	138.3	329.0	141.8
6	1.21	0.26	12.4	104.5	109.3	112.7	0.0	137.0	329.5	141.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	-0.8	143.5-0.5854	0.34	5	0.82390	6	0.86277	11	0.94051	16	0.97237	23	0.93542	29	0.93924	34	0.98929	35	0.78602
2	-0.3	143.9-1.9939	0.34	4	0.77420	7	0.88109	12	0.98838	17	0.91821	24	0.96473	30	0.93860	41	0.29503	36	0.96226
3	-0.3	143.9-1.8475	0.34	3	1.45202	8	0.91757	13	0.99821	18	0.96055	25	0.97813	31	0.92405	42	0.27617	37	0.94179
4	-0.3	143.5-1.8475	0.34	2	2.53834	9	0.98763	14	0.96409	19	0.98763	26	0.96154	32	0.93414	37	0.98064	38	0.99213
5	-0.3	143.1-1.7243	0.34	1	2.92795	10	0.96664	15	1.00105	20	0.99468	27	0.97877	33	0.93194	40	0.29507	43	0.35966
6	-0.3	142.2-1.8475	0.34							21	1.44582	28	0.96409						

WIND TUNNEL TEST CONDITIONS..... Q 10.286 PT 98.862 PS 1.214 R/L 10.6 MACH 3.488 TEMP 102.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= -0.3 TC= 143.4 PTC/PSA= -0.22 PSM(221)/PSA= 0.2784
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 0.

23 AUGUST 1975

MSFC TRISONIC WIND TUNNEL MONTGOMERY, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 376/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	422.89	15.5	154.8	165.6	178.2	0.0	223.3	485.5	469.1
2	1.21	422.89	18.2	151.7	162.6	175.6	0.0	235.8	501.1	476.4
3	1.21	424.47	12.4	150.4	169.4	173.0	0.0	249.7	514.6	485.1
4	1.21	430.78	16.6	147.8	158.2	171.7	0.0	261.0	525.8	488.6
5	1.21	437.62	12.4	146.1	156.9	169.5	0.0	274.8	534.9	492.5
6	1.21	442.89	11.8	145.2	155.2	169.1	0.0	284.0	542.8	495.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	428.3	468.2	0.8380	0.80	5	0.82634	6	0.88265	11	0.94739	16	0.97415	23	0.93656	29	0.93975	34	0.91188	35	0.71166
2	428.8	475.1	0.8380	0.81	4	0.77983	7	0.88849	12	0.98888	17	0.94675	24	0.96778	30	0.93911	41	0.87789	36	0.90470
3	421.8	484.2	0.8382	0.82	3	1.46919	8	0.91999	13	0.99263	18	0.97286	25	0.98116	31	0.93210	42	0.78481	37	0.94675
4	428.7	486.1	0.8379	0.82	2	2.56312	9	0.98625	14	0.97096	19	0.98944	26	0.96778	32	0.93481	39	0.97988	38	1.02002
5	435.8	492.8	0.8378	0.83	1	2.95749	10	0.96985	15	1.00537	20	0.99581	27	0.98434	33	0.93481	40	0.73205	43	0.68808
6	441.5	495.1	0.8375	0.83							21	1.74187	28	0.96985						

WIND TUNNEL TEST CONDITIONS..... 0 10.289 PT 98.015 PS 1.214 R/L 10.6 MACH 3.480 TEMP 103.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 428.0 TC= 483.8 PTC/PSA= 352.47 PSM(22)/PSA= 0.6739
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 568. HEATER TOTAL TEMPERATURE= 580.

A-197

TEST 575 JUN 3 760

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1468.15	13.4	160.0	182.5	175.1	0.0	234.5	358.4	312.5
2	1.21	1497.62	16.0	160.0	180.8	174.7	0.0	260.5	565.7	316.0
3	1.21	1512.36	12.9	156.1	177.7	172.5	0.0	285.3	568.3	521.9
4	1.21	1522.36	17.6	154.8	175.1	172.1	0.0	304.8	571.4	525.0
5	1.21	1515.52	17.1	155.2	173.8	172.1	0.0	323.0	571.8	527.1
6	1.21	1497.62	17.6	151.3	171.7	171.7	0.0	339.0	572.7	528.4

[illegible]

WIND TUNNEL TEST CONDITIONS.....	Q	10.298	PT	99.019	PS	1.214	R/L	10.6	MACH	3.480	TEMP	103.9
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1902.9	TC=	521.9	PTC/PSA=	1237.39	PSN(22)/PSA=	1.0403				
HEATER PARAMETERS.....	HEATER TOTAL	PRESSURE= 2045.				HEATER	TOTAL TEMPERATURE= 600.					

202

44-375 204 3711

WIND TUNNEL TEST CONDITIONS.....	Q	10,287	PT	89,990	PS	1.214	R/L	10.5	MACH	3.483	TEMP	185.6
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC	1498.0	TC	598.3	PTC/PSA	1229.91			PSH(22)/PSA	1.0191		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1995.					HEATER TOTAL TEMPERATURE= 620.						

755-495 JUN 30 1962

WIND TUNNEL TEST CONDITIONS.....	Q	10.207	PT	69.998	PS	1.214	R/L	10.4	MACH	3.400	TEMP	100.3
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1536.0	TC=	538.5	PTC/PSA=	1265.93	PSN(221)/PSA= 1.0220					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2075.					HEATER TOTAL TEMPERATURE= 620.						

A-200

TEST 575 RUN 379.0

WIND TUNNEL TEST CONDITIONS.....	Q	10.290	PT	90.023	PS	1.214	R/L	10.6	MACH	3.480	TEMP	103.6
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	855.3	TC=	481.1	PTC/PSA=	704.34	PSM(22)/PSA= 0.8335					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1100.				HEATER TOTAL TEMPERATURE= 460.							

Ä-201

TEST 575 RUN 3ED/G

[illegible]

WIND TUNNEL TEST CONDITIONS.....	Q 10.292	PT 98.036	PS 1.215	R/L 10.6	MACH 3.488	TEMP 103.7
MODEL ATTITUDE.....	ALPHA 0.00	BETA 0.00	ROLL 0.0			
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC= 1224.6	TC= 399.7	PTC/PRA= 1800.32	PWR1221/PRA= 0.9434		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1600.			HEATER TOTAL TEMPERATURE= 465.		

A-202

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OF POOR QUALITY

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					TCH		
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1523.38	1500.2	102.3	105.0	101.9	0.0	137.4	479.0	370.7
2	1.21	1501.00	1481.3	101.9	105.3	101.9	0.0	159.1	458.2	380.2
3	1.21	1505.48	1483.4	99.7	104.0	102.3	0.0	179.9	443.5	382.8
4	1.21	1507.59	1481.3	98.8	104.0	101.4	0.0	199.8	434.4	388.9
5	1.21	1479.69	1451.8	98.8	102.7	102.7	0.0	215.5	430.5	393.2
6	1.21	1438.22	1400.7	99.7	102.7	102.7	0.0	231.5	429.2	392.3

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1526.8	371.1	0.0361	1.25	5 0.84497	6 0.87811	11 0.93992	16 0.97943	23 0.94828	29 0.95338	34 0.94056	35 0.72788		
2	1581.8	381.1	0.0364	1.24	4 0.88037	7 0.89595	12 1.00173	17 0.96159	24 0.99727	30 0.95205	41 1.04578	36 0.91953		
3	1588.6	382.4	0.0363	1.24	3 1.58868	8 0.92526	13 1.00364	18 0.97815	25 0.98899	31 0.94183	42 1.10241	37 0.96796		
4	1588.6	388.9	0.0361	1.24	2 2.62476	9 1.04189	14 0.96477	19 1.00046	26 0.97497	32 0.94757	39 1.00555	38 1.03359		
5	1483.9	393.2	0.0365	1.24	1 2.95867	10 0.97568	15 1.01384	20 1.00818	27 0.99580	33 0.94374	40 1.13386	43 1.03487		
6	1442.3	392.3	0.0365	1.23				21 1.09185	28 0.98078					

WIND TUNNEL TEST CONDITIONS.....	Q	10.267	PT	39.998	PS	1.214	R/L	10.6	MACH	3.480	TEMP	103.7
MODEL ATTITUDE.....	ALPHA	8.08	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PSIG	1495.2	TC	384.8	PTC/PSA	1231.65	PSH/221/PSA	1.0222				
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2060.					HEATER TOTAL TEMPERATURE= 250.						

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23 AUGUST 1973

NSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 38276

FRAME	PSA	ETC	TEMPERATURE DATA---DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.38	516.15	500.6	91.0	91.9	92.6	0.0	90.0	253.2	155.2
2	0.37	519.73	509.2	92.6	91.9	92.6	0.0	101.9	254.9	144.6
3	0.38	521.83	511.3	91.9	92.3	93.2	0.0	105.3	225.9	134.4
4	0.38	525.52	516.0	91.9	92.3	92.8	0.0	106.2	213.3	125.3
5	0.38	529.73	519.7	91.9	92.3	93.5	0.0	108.4	181.0	115.8
6	0.40	535.26	520.8	91.0	91.9	93.2	0.0	106.0	161.4	105.0

FR	ETC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	517.1	155.6	0.0378	0.44	5	1.13583	6	1.12569	11	1.12569	16	1.17639	23	1.14597	29	1.17639	34	1.15611	35	1.09526
2	519.7	145.7	0.0377	0.43	4	1.07498	7	1.06484	12	1.06512	17	1.13583	24	1.09526	30	1.13583	41	1.11555	36	1.06484
3	520.8	135.7	0.0380	0.43	3	1.06484	8	1.03441	13	1.06484	18	1.12569	25	1.07498	31	1.11555	42	1.06512	37	1.07498
4	523.4	125.6	0.0381	0.44	2	1.09526	9	1.05470	14	1.07498	19	1.13583	26	1.10540	32	1.12569	39	1.06512	38	1.10540
5	528.7	117.1	0.0378	0.44	1	1.12569	10	1.06484	15	1.09526	20	1.14597	27	1.11555	33	1.12569	40	1.09526	43	1.10540
6	529.2	105.8	0.0380	0.45																

WIND TUNNEL TEST CONDITIONS..... 0 0.068 PT 0.454 PS 0.381 R/L 0.1 MACH 0.506 TEMP 77.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 1.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 523.2 TC= 131.6 PTC/PSA= 1371.62 PSM(22)/PSA= 1.1463
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE=

A-204

27 AUGUST 1953

SPC 75, 50 INCH WIND TUNNEL, UNIVERSITY OF ALABAMA
PLANE TECHNOLOGY TEST, INCIDENT PHASE

ORIGINAL PAGE IS
OF POOR QUALITY

FRAME	PSI	PTC	TEMPERATURE DATA, DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.41	933.41	915.5	94.9	96.7	97.5	0.0	100.1	134.1	93.4
2	0.39	929.73	916.6	94.5	96.7	97.1	0.0	99.3	112.7	83.7
3	0.39	944.47	927.6	95.4	97.1	97.5	0.0	97.5	75.4	74.6
4	0.39	941.84	927.6	95.8	97.1	97.1	0.0	95.4	51.5	65.5
5	0.40	951.31	930.3	95.4	96.7	97.1	0.0	91.9	68.9	60.7
6	0.41	949.73	935.5	95.4	96.7	97.1	0.0	88.4	59.4	55.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	932.9	94.9	0.0371	0.50	5	1.20612	6	1.18666	11	1.19639	16	1.24502	23	1.21584	29	1.25475	34	1.24502	35	1.15748
2	930.3	85.4	0.0375	0.46	4	1.09912	7	1.09912	12	1.10885	17	1.17694	24	1.11857	30	1.17694	41	1.16721	36	1.10885
3	943.9	76.7	0.0371	0.45	3	1.07967	8	1.06021	13	1.09912	18	1.14775	25	1.09912	31	1.13863	42	1.12630	37	1.09912
4	940.3	67.2	0.0375	0.46	2	1.09912	9	1.06021	14	1.09912	19	1.15748	26	1.10885	32	1.12630	39	1.10885	38	1.12830
5	950.8	61.6	0.0373	0.45	1	1.11857	10	1.06994	15	1.10885	20	1.14775	27	1.11857	33	1.13863	40	1.12830	43	1.12830
6	948.7	55.9	0.0375	0.46																

WIND TUNNEL TEST CONDITIONS..... 0 0.071 PT 0.473 PS 0.398 R/L 0.1 MACH 0.504 TEMP 78.5
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 941.1 TC= 73.6 PTC/PSA= 2366.64 PSM[22]/PSA= 1.1688
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 0.

A-205

23 AUGUST 1975

WFO TRISDAIC WIND TUNNEL MONTVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 075 RUN 38470

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES F--HEIT--					NOZZLE-STEM FEET--P-PIPE	TC	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.43	1377.10	1353.9	83.6	80.2	79.3	0.0	78.9	67.0	65.9
2	0.41	1361.84	1355.5	83.2	81.1	79.3	0.0	77.2	68.3	58.1
3	0.42	1394.99	1367.6	81.9	80.2	78.5	0.0	74.6	53.3	52.5
4	0.42	1396.05	1374.5	81.9	79.0	77.2	0.0	71.5	46.4	47.7
5	0.43	1406.57	1387.6	81.1	79.3	75.4	0.0	67.8	39.5	44.2
6	0.43	1415.52	1392.4	82.4	80.2	73.7	0.0	64.2	34.7	39.0

FR	PTC	TC P47/PTC	PORT-22	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA	NO PS-/PSA
1	1378.0	67.2	0.0365	0.01	5	1.12560	6	1.14390	11	1.13475	16	1.13031	21	1.15305	29	1.20750	34	1.17135	35	1.13475
2	1383.9	59.0	0.0368	0.01	4	1.10729	7	1.12560	12	1.13475	17	1.15965	24	1.14390	30	1.18965	41	1.16220	36	1.14390
3	1395.5	54.9	0.0367	0.01	3	1.10729	8	1.10729	13	1.13475	18	1.15965	25	1.15305	31	1.18965	42	1.16220	37	1.15305
4	1396.6	47.4	0.0367	0.01	2	1.13475	9	1.10729	14	1.14390	19	1.15051	26	1.17135	32	1.18051	39	1.15051	38	1.16220
5	1405.4	40.5	0.0365	0.01	1	1.14390	10	1.11645	15	1.14390	20	1.14965	27	1.16220	33	1.19851	40	1.17135	43	1.17135
6	1416.6	41.2	0.0365	0.02																

WIND TUNNEL TEST CONDITIONS..... 2 0.175 PT 0.502 PS 0.423 R/L 0.1 MACH 0.502 TEMP 70.5
 MODEL ATTITUDE..... ALPHA 0.0 BETA 0.00 ROLL 0.0
 AVERAGE NOZZLE/NOZZLE PARAMETERS.. PTC= 1396.1 T= 52.5 PTC/P-PIPE= 33.266 PS-(22)/PSA= 1.2166
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 160.0 HEATER TOTAL TEMPERATURE=

A-206

A-207

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WIND TUNNEL TEST CONDITIONS..... Q 0.074 PT 2.554 PS 0.475 R/L 3.1 Mach 1.47 TS-P 75.9
NOSE ATTITUDE..... ALPHA 0.00 BETA 1.00 ROLL 0.0
-VERAGE NOSE/NOZZLE PARAMETERS.. PTC= 1701.5 TC= 48.8 PTC/PS4= 3571.17 PS4(22)/PS4= 1.1693
HEATER PARAMETERS..... HEATER TOTAL EFFICIENCY= 210% HEATER TOTAL TEMPERATURE=

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05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
LUNAR TECHNOLOGY TEST NOZZLE CALIBRATION CASE

TEST 575 RUN 401/0

TEMPERATURE DATA---DEGREES FAHRENHEIT---										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1	0.43	1648.67	1611.8	108.4	111.9	114.9	152.6	156.5	496.4	373.3
2	0.41	1647.62	1618.1	107.5	110.6	114.9	150.0	181.2	471.7	381.9
3	0.40	1689.19	1652.4	107.5	111.4	115.8	151.3	204.6	456.5	389.3
4	0.41	1672.88	1637.1	108.0	111.4	116.6	150.4	225.0	446.2	394.5
5	0.2	1676.56	1658.2	108.	111.9	117.5	153.0	22.8	3.9	396.7
6	0.43	1623.93	1586.6	108.8	112.3	116.4	147.8	259.7	440.4	397.5

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1653.93	0.00	374.1	0.00874	0.03998	0.03296	0.03756	0.03591	0.03933
2	1644.98	0.00	381.1	0.03815	0.04038	0.03328	0.03792	0.03628	0.03973
3	1691.83	0.00	389.3	0.03745	0.03967	0.03270	0.03729	0.03565	0.03906
4	1677.62	0.00	394.5	0.03788	0.04011	0.03307	0.03768	0.03605	0.03951
5	1675.51	0.00	396.7	0.03767	0.03988	0.03288	0.03749	0.03584	0.03926
6	1625.51	0.00	397.5	0.03778	0.04000	0.03301	0.03762	0.03598	0.03940

TUNNEL STATIC PRESSURE= 0.417

HEATER TOTAL PRESSURE= 2100.

HEATER TOTAL TEMPERATURE= 560.

ALPHA= 0.02

05 SEPTEMBER 1973

MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, L B H
PLU E TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 40270

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	0.44	1281.30	1261.3	133.5	143.1	156.5	152.2	178.2	361.5
2	0.41	1259.72	1233.4	133.5	142.6	155.6	150.4	195.5	374.6
3	0.42	1283.40	1259.7	133.5	143.1	156.5	150.0	213.7	382.8
4	0.44	1313.40	1287.6	134.8	143.5	157.4	152.2	231.5	388.9
5	0.45	1310.77	1280.8	134.0	142.2	157.4	152.2	246.7	394.1
6	0.47	1320.25	1294.5	133.5	142.6	157.8	148.7	260.5	396.7

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1279.19	0.00	361.5	0.03816	0.04012	0.03314	0.03780	0.03688	0.03949
2	1268.77	0.00	375.0	0.03867	0.04073	0.03370	0.03635	0.03666	0.04012
3	1279.19	0.00	382.8	0.03884	0.04087	0.03384	0.03800	0.03681	0.04028
4	1313.93	0.00	389.7	0.03822	0.04022	0.03330	0.03759	0.03619	0.03967
5	1317.09	0.00	395.4	0.03858	0.04061	0.03360	0.03828	0.03656	0.04003
6	1325.51	0.00	396.2	0.03854	0.04058	0.03356	0.03821	0.03653	0.04000

TUNNEL STATIC PRESSURE= 0.437 HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 460. ALPHA= 0.02

A-209

05 SEP 1973
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MSFC TRISONIC WIND TUNNEL MONTSVILL, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

T ST 575 RUN 40370
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-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1	0.37	757.06	743.9	106.2	115.3	124.4	150.0	168.6	559.7	358.9
2	0.37	739.69	726.0	104.9	114.5	124.0	150.0	184.2	536.7	371.1
3	0.38	742.32	728.6	106.7	115.3	124.9	151.3	201.2	521.1	381.5
4	0.40	743.90	727.1	105.3	114.9	124.4	152.6	215.0	506.8	389.7
5	0.40	754.95	742.3	107.1	115.3	125.7	151.3	230.2	499.4	399.7
6	0.43	766.01	753.4	106.2	115.3	125.7	152.2	242.3	492.5	404.4

FRAME	P C	PSC	C	PSN(44)/P C	PSN(45)/P C	PSN(46)/P C	PSN(47)/P C	PSN(48)/P C	PSN(49)/P C
1	757.06	0.00	359.4	0.03953	0.04147	0.03451	0.03944	0.03750	0.04094
2	738.11	0.00	371.1	0.03942	0.0414	0.03445	0.03942	0.03747	0.04086
3	740.74	0.00	381.9	0.03928	0.04125	0.03433	0.03923	0.03734	0.04076
4	743.90	0.00	390.2	0.03938	0.04130	0.03436	0.03924	0.03736	0.04081
5	753.90	0.00	399.7	0.03930	0.04124	0.03430	0.03912	0.03735	0.04067
6	763.90	0.00	404.9	0.03922	0.04123	0.03429	0.03913	0.03730	0.04070

TUNNEL STATIC PRESSURE= 0.391 HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 520. ALPHA= 0.02

A-210

05 SEPTEMBER 1973

MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NO LE CALIBRATION PHASE

TEST 575 RUN 40470

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
0	0.93	-1880.17	78.8	214.2	173.4	190.7	211.1	-1372.9	-178.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
3	471.41	0.00	383.2	0.04001	0.04178	0.03506	0.03994	0.03789	0.04129
4	475.62	0.00	391.0	0.04001	0.04190	0.03510	0.04001	0.03798	0.04134
5	480.35	0.00	398.0	0.04003	0.04186	0.03511	0.03996	0.03795	0.04135
6	484.04	0.00	404.5	0.04014	0.04186	0.03518	0.03993	0.03801	0.04145

TUNNEL STATIC PRESSURE= 0.930 HEATER TOTAL PRESSURE= 1060. HEATER TOTAL TEMPERATURE= 530. ALPHA= -0.34

A-211

05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
LUNAR TECHNOLOGY TEST NOZZLE CALIBRATION CASE

TEST 575 RUN 404/C

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.50	63.38	52.8	166.9	191.2	205.5	177.8	22.6	52.5	36.6
2	0.53	65.8	56.0	166.9	190.7	205.5	150.	233.7	51.6	373.7
3	0.53	471.80	462.8	167.8	180.3	205.1	147.8	243.6	508.1	383.7
4	0.55	476.53	466.5	166.0	189.9	205.1	146.3	252.3	502.0	391.5
5	0.55	481.27	473.9	168.6	190.7	205.5	152.6	261.4	497.7	397.5
6	0.57	483.90	474.4	167.8	189.4	205.1	147.8	270.1	495.5	403.6

FRAME	P C	PSC	C	PSN(44)/P C	PSN(45)/P C	PSN(46)/P C	PSN(47)/P C	PSN(48)/P C	PSN(49)/P C
0	14.43	0.00	150.0	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

TUNNEL STATIC PRESSURE= 0.538 HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0. ALPHA= 0.02

A-212

05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNE HUNTSVI E. A ABAMA
PLUME TECHNOLOGY TEST MUZZLE CALIBRATIONPHASE

TEST 575 RUN 405/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.46	1882.85	1844.4	132.7	137.9	125.3	148.3	178.0	173.0	68.0
2	0.46	1838.64	1806.5	133.1	137.9	125.7	150.4	167.8	126.2	70.7
3	0.46	1657.59	1624.4	132.2	137.9	125.3	148.7	156.5	95.8	59.0
4	0.45	1493.38	1465.0	132.7	137.9	125.3	151.3	143.9	75.4	51.2
5	0.44	1337.06	1316.0	132.7	137.4	124.9	150.9	133.1	62.4	46.8
6	0.43	1214.95	1195.5	133.1	137.0	124.4	148.3	123.6	53.8	44.7

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1888.11	0.00	90.6	0.03747	0.03954	0.03255	0.03746	0.03534	0.03876
2	1832.64	0.00	72.4	0.03778	0.03984	0.03283	0.03770	0.03562	0.03906
3	1659.69	0.00	59.8	0.03837	0.04044	0.03331	0.03833	0.03619	0.03966
4	1493.40	0.00	52.9	0.03842	0.04042	0.03340	0.03835	0.03616	0.03967
5	1339.69	0.00	47.7	0.03893	0.04100	0.03386	0.03888	0.03669	0.04023
6	1214.95	0.00	45.1	0.03923	0.04126	0.03410	0.03912	0.03692	0.04046

TUNNEL STATIC PRESSURE= 0.451 HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 70. ALPHA= 0.02

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05 SEPTEMBER 1973

 MSFC TRANSONIC WIND TUNNEL HUNTSVILLE ALABAMA
 PLUME TECH NOLOGY TEST NOZZLE CALIBRATION PASE

TEST 575 RUN 40670

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEI					MODEL	STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.41	1628.11	1598.6	94.5	92.3	88.4	151.7	144.8	696.6	482.5
2	0.40	1642.85	1609.2	94.1	92.8	89.3	152.6	163.4	658.5	495.5
3	0.40	1677.59	1639.7	94.1	92.8	89.7	152.2	218.5	632.5	505.9
4	0.41	1702.85	1670.7	96.7	94.5	91.5	151.7	250.1	616.9	515.0
5	0.41	1686.01	1655.0	95.8	94.1	92.8	151.7	277.4	604.3	517.6
6	0.40	1647.06	1614.4	98.0	94.9	94.1	148.3	301.3	596.5	520.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1623.90	0.00	482.1	0.03844	0.04031	0.03339	0.03807	0.03633	0.03971
2	1648.64	0.00	495.1	0.03831	0.04019	0.03321	0.03790	0.03621	0.03958
3	1682.85	0.00	505.9	0.03796	0.03981	0.03293	0.03775	0.03589	0.03921
4	1704.95	0.00	515.9	0.03781	0.03964	0.03280	0.03763	0.03573	0.03908
5	1683.38	0.00	517.6	0.03829	0.04015	0.03320	0.03813	0.03615	0.03950
6	1647.59	0.00	520.6	0.0333	0.04021	0.03325	0.0319	0.03621	0.03957

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TUNNEL STATIC PRESSURE= 0.409 HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 600. ALPHA= 0.02

A-214

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

A-215

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	480.8	229.8	0.0330	1.22	5	0.84880	6	0.88686	11	0.95376	16	0.99390	23	0.95886	29	0.91044	34	3.82206	35	0.73141
2	475.0	233.7	0.0334	1.22	4	0.80149	7	0.98343	12	1.00919	17	0.91936	24	0.99963	30	0.96396	41	0.95631	36	0.93720
3	487.6	235.8	0.0326	1.22	3	1.46855	8	0.94229	13	1.81238	18	1.00346	25	0.98434	31	0.98307	42	3.82206	37	1.34049
4	490.8	238.4	0.0324	1.22	2	2.56184	9	1.01875	14	0.97734	19	1.80664	26	0.95312	32	0.95631	39	0.93975	38	1.00473
5	489.2	238.9	0.0326	1.22	1	2.57076	10	0.98689	15	1.02384	20	1.01238	27	0.99645	33	0.95822	40	2.01137	43	0.91999
6	493.9	240.2	0.0323	1.22							21	1.01811	28	0.98434						

WIND TUNNEL TEST CONDITIONS..... Q 10.289 PT 90.015 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.8
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 486.2 TC= 236.1 PTC/PSA= 400.42 PSM(221)/PSA= 1.840
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 280.

07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 40970

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MOUFL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	888.66	870.8	93.6	97.1	101.4	151.3	129.2	336.0	234.5
2	1.21	878.66	860.2	92.3	95.8	100.1	150.0	135.3	318.2	235.8
3	1.21	879.71	869.2	92.8	94.9	98.8	152.6	142.2	303.0	235.2
4	1.21	897.61	879.2	91.0	94.1	98.4	150.0	148.3	292.2	238.0
5	1.21	898.76	876.0	91.9	93.6	97.5	152.6	153.5	281.8	237.6
6	1.21	904.97	898.8	90.6	92.8	97.1	147.8	158.7	274.8	238.4

FR	PTC	IC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	887.1	235.0	0.0230	1.25	5 0.84987	6 0.88746	11 0.95372	16 0.99194	23 0.95818	29 0.98976	34 3.82188	35 0.73018			
2	879.7	236.7	0.0232	1.25	4 0.88337	7 0.98482	12 1.08914	17 0.92186	24 1.08022	30 0.96327	41 1.24423	36 0.93460			
3	877.1	237.1	0.0233	1.25	3 1.47294	8 0.94161	13 1.01233	18 1.08405	25 0.98493	31 0.98493	42 3.82188	37 1.26653			
4	896.8	238.4	0.0229	1.25	2 2.97510	9 1.01878	14 0.97729	19 1.00787	26 0.95372	32 0.95881	39 1.22886	38 1.00485			
5	898.2	238.8	0.0231	1.25	1 2.98147	10 0.98748	15 1.02380	20 1.01424	27 0.99704	33 0.98455	40 3.57533	43 1.20154			
6	905.5	238.4	0.0228	1.26				21 1.02125	28 0.98430						

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.019 PS 1.214 R/L 18.7 MACH 3.480 TFMP 99.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 889.3 TC= 237.3 PTC/PSA= 732.35 PSM(22)/PSA= 1.0309
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 250.

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 410/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1290.76	1266.6	95.4	99.7	102.7	150.0	124.4	323.4	224.6
2	1.21	1298.66	1269.7	94.1	98.8	101.9	148.3	133.1	298.3	225.0
3	1.21	1289.71	1263.9	94.5	97.5	101.0	148.3	140.8	280.1	224.1
4	1.21	1292.87	1270.8	93.2	97.5	100.6	150.9	146.5	267.5	224.1
5	1.21	1310.24	1282.9	91.9	95.4	98.8	150.0	151.3	255.3	223.3
6	1.22	1319.71	1290.8	90.6	95.4	98.4	150.0	155.6	249.7	223.7

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1292.3	225.0	0.0192	1.34	5 0.85413	6 0.88980	11 0.95413	16 0.99426	23 0.96050	29 0.90764	34 3.82099	35 0.72547		
2	1301.0	225.4	0.0191	1.34	4 0.88573	7 0.90509	12 1.00764	17 0.92356	24 1.00254	30 0.96170	41 1.49999	36 0.93311		
3	1293.4	225.0	0.0193	1.34	3 1.47786	8 0.94140	13 1.01082	18 1.00573	25 0.98662	31 1.00381	42 3.82099	37 1.40636		
4	1292.3	224.1	0.0193	1.35	2 2.50279	9 1.01046	14 0.97706	19 1.00891	26 0.95350	32 0.97380	39 1.43884	38 1.00573		
5	1313.9	223.7	0.0191	1.35	1 2.50215	10 0.98598	15 1.02483	20 1.01783	27 0.99808	33 0.97643	40 3.82099	43 1.42483		
6	1327.0	223.7	0.0189	1.36				21 1.02866	28 0.98216					

WIND TUNNEL TEST CONDITIONS..... 0 10.292 PT 90.040 PS 1.215 R/L 10.7 MACH 3.480 TEMP 99.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1303.6 TC= 224.5 PTC/PSA= 1073.29 PSM(22)/PSA= 1.1081
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 240.

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MSFC HYPERSONIC WIND TUNNEL MOUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 410/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1466.55	1438.1	73.7	73.3	71.1	152.2	97.5	402.3	153.5
2	1.21	1488.76	1451.8	73.3	72.8	72.8	151.7	103.6	315.2	124.4
3	1.21	1487.61	1456.8	72.8	72.0	71.1	158.8	185.3	243.2	99.3
4	1.21	1488.55	1461.3	73.7	72.8	72.4	158.4	104.8	189.8	88.6
5	1.21	1491.82	1464.4	74.1	72.4	72.4	151.3	108.6	163.9	65.5
6	1.22	1492.34	1466.8	73.7	72.4	72.8	151.3	95.4	168.6	56.4

[illegible]

WIND TUNNEL TEST CONDITIONS.....	Q	10.291	PT	90.031	PS	1.214	R/L	10.7	MACH	3.480	TEMP	100.7
MODEL ATTITUDE.....	ALPHA	0.62	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1484.7	TC=	97.0	PTC/PSA=	1222.54	PSM(22)/PSA=	1.232				
HEATER PARAMETERS.....	HEATER TOTAL	PRESSURE= 1480.				HEATER TOTAL	TEMPERATURE= 0.					

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 411/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.22	1702.87	1666.0	74.6	75.4	75.4	152.2	111.0	220.7
2	1.22	1696.55	1660.8	74.6	75.8	75.0	150.0	121.0	218.6
3	1.21	1671.29	1636.6	75.4	75.4	75.4	148.3	130.1	220.7
4	1.21	1633.39	1594.4	75.4	75.0	76.3	152.6	136.1	218.5
5	1.21	1567.88	1535.8	74.1	74.6	75.4	152.6	142.2	215.9
6	1.21	1519.71	1496.6	74.1	74.6	75.4	150.0	147.0	212.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1702.3	220.7	0.0171	1.41	5 0.89720	6 0.89223	11 0.94827	16 0.99349	23 0.96101	29 0.91070	34 3.82046	35 0.73238			
2	1780.7	220.7	0.0171	1.42	4 0.88944	7 0.90878	12 1.08622	17 0.92853	24 1.00240	30 0.96292	41 1.70867	36 0.93617			
3	1678.1	221.1	0.0174	1.42	3 1.48513	8 0.93935	13 1.01868	18 1.00750	25 0.98903	31 0.99731	42 3.82046	37 1.07373			
4	1639.7	219.8	0.0175	1.42	2 2.59771	9 1.01896	14 0.97438	19 1.01132	26 0.95591	32 0.96929	39 1.58066	38 1.01514			
5	1572.3	215.9	0.0179	1.42	1 2.59898	10 0.98457	15 1.02533	20 1.02342	27 1.08049	33 0.98266	40 3.82046	43 1.56219			
6	1516.6	212.9	0.0180	1.41				21 1.03679	28 0.98393						

WIND TUNNEL TEST CONDITIONS..... 0 10.294 PT 90.052 PS 1.215 R/L 10.7 MACH 3.480 TEMP 100.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1636.3 TC= 218.5 PTC/PSA= 1347.04 PSM(221)/PSA= 1.1666
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 240.

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OF POOR QUALITY

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 411/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING	FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1918.24	1872.9	114.5	121.4	130.1	148.3	144.4	210.3	85.4
2	1.21	1753.92	1716.7	113.6	120.1	128.8	152.6	136.1	158.2	67.6
3	1.21	1553.92	1525.8	112.3	117.9	127.5	148.3	126.2	123.1	57.2
4	1.21	1488.24	1374.4	111.8	116.2	124.9	152.2	116.6	94.5	49.4
5	1.21	1264.45	1242.3	110.1	115.3	122.3	147.8	108.0	101.4	45.5
6	1.21	1153.39	1139.8	108.8	113.2	120.1	132.6	108.1	130.9	42.1

[illegible]

WIND TUNNEL TEST CONDITIONS.....	Q	10.291	PT	90.031	PS	1.214	R/L	10.6	MACH	3.400	TEMP	101.0
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC	1507.3	TC	59.3	PTC/PSA	1241.10			PSM(22)/PSA	1.3895		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2100.					HEATER TOTAL TEMPERATURE= 0.						

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05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 412/G

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.07	1576.00	1544.4	85.0	86.7	87.6	152.6	132.7	330.3	277.0
2	5.11	1603.89	1569.7	88.0	87.1	88.9	150.0	146.1	322.1	282.7
3	5.11	1591.77	1560.2	88.4	88.4	89.7	148.3	158.2	317.3	286.6
4	5.09	1588.63	1551.8	86.3	87.6	90.2	150.0	167.3	315.2	287.4
5	5.12	1531.79	1501.8	89.3	88.9	92.3	151.7	176.4	314.3	287.4
6	5.09	1467.05	1436.0	89.3	90.6	93.6	152.6	182.9	311.7	286.6

FR	PTC	IC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	
1	1577.1	277.4	0.0179	5.22	5	0.98743	6	0.87984	11	0.96631	16	0.92763	23	0.94052	29	0.90032	34	2.42943	35	0.97810									
2	1507.1	282.7	0.0176	5.28	4	0.78882	7	0.95493	12	0.94356	17	0.92535	24	1.00499	30	0.97465	41	1.06415	36	1-15517									
3	1593.4	287.4	0.0178	5.29	3	1.02471	8	0.99968	13	0.95190	18	2.10631	25	0.92535	31	1.04292	42	2.07597	37	2.14120									
4	1591.3	287.4	0.0177	5.28	2	1.37058	9	1.01485	14	0.95645	19	0.98148	26	0.89046	32	1.02370	39	1.64671	38	1.09525									
5	1532.8	287.9	0.0180	5.27	1	1.43885	10	0.99968	15	0.97996	20	0.96479	27	0.95838	33	2.12376	40	1.61026	43	1.00651									
6	1471.3	286.6	0.0184	5.24																									

WIND TUNNEL TEST CONDITIONS..... 0 7.744 PT 18.009 PS 5.100 R/L 5.3 MACH 1.473 TEMP 104.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1552.1 IC= 284.9 PTC/PSA= 306.32 PSH(22)/PSA= 1.0319
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 310.

NSFC TRAISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODFL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.19	1637.58	1618.2	88.4	88.8	90.6	152.6	141.8	265.3	244.9
2	5.16	1567.98	1529.2	87.6	88.8	98.6	158.8	148.7	265.7	245.8
3	5.22	1507.58	1471.3	91.5	88.9	93.2	152.2	156.1	264.8	235.0
4	5.22	1444.95	1412.1	91.8	98.2	93.6	147.8	168.4	262.7	154.8
5	5.21	1388.74	1356.5	89.7	89.3	94.1	152.6	163.4	260.5	153.0
6	5.21	1334.42	1308.1	91.8	89.7	95.4	150.4	165.6	257.5	220.7

[illegible]

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WIND TUNNEL TEST CONDITIONS..... Q 7.748 PT 18.000 PS 5.207 R/L 5.3 MACH 1.458 TEMP 106.3
WIND ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE NOSEL/NOZZLE PARAMETERS.. PTC= 1479.2 TC= 207.2 PTC/PSA= 284.06 PSM(22)/PSA= 1.0073
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 290.

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NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

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FR	PTC	IC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA			
1	1273.4	241.9	0.0195	5.16	5	0.86364	6	0.90153	11	0.95597	16	0.94329	23	0.94627	29	0.91719	34	2.62316	35	0.97014
2	1268.6	244.9	0.0196	5.16	4	0.86534	7	0.94180	12	0.94329	17	0.92018	24	1.80906	30	1.80293	41	8.98729	36	1.12697
3	1289.2	247.1	0.0194	5.16	3	1.02979	8	1.02084	13	0.95970	18	0.95746	25	0.93733	31	1.05664	42	2.54930	37	1.05736
4	1276.0	247.5	0.0195	5.14	2	1.37132	9	0.98952	14	0.94777	19	0.97163	26	0.89557	32	1.00146	39	0.97237	38	1.07752
5	1250.2	247.5	0.0197	5.14	1	1.41755	10	0.99102	15	0.94105	20	1.00444	27	0.94627	33	1.01040	40	2.33701	43	0.97237
6	1218.6	246.2	0.0199	5.13								71	1.01786	28	0.94031					

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WIND TUNNEL TEST CONDITIONS..... Q 7.745 PT 17.994 PS 5.187 R/L 5.3 MACH 1.461 TEMP 105.3
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.80 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1262.7 TC= 245.9 PTC/PSA= 243.42 PSM[22]/PSA= 0.9921
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 280.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST,..NON-QUIESCENT PHASE

TEST 575 RUN 414/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.19	892.84	872.8	100.4	112.7	116.2	150.4	150.9	244.5	228.8
2	5.16	896.53	878.1	111.0	113.2	115.8	152.6	154.3	245.4	230.2
3	5.18	904.95	887.1	107.5	110.6	114.5	151.7	156.5	246.2	231.9
4	5.17	917.85	899.7	108.8	110.1	113.6	148.3	159.1	247.5	234.5
5	5.17	913.89	897.1	107.1	108.8	113.6	151.7	161.3	248.0	235.4
6	5.15	918.10	897.1	106.2	108.4	113.2	148.3	163.4	248.8	235.8

[illegible]

WIND TUNNEL TEST CONDITIONS..... Q 7.747 PT 18.002 PS 5.171 R/L 5.3 MACH 1.463 TEMP 105.1
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.8
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 900.4 TC= 233.1 PTC/PSA= 175.67 PSM(22)/PSA= 0.9759
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100, HEATER TOTAL TEMPERATURE= 270.

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TEST 575 RUN 415/0

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FRAME	PSA	PIC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.28	461.26	453.9	110.1	115.8	119.7	152.2	140.0	231.1	205.1
2	5.27	463.89	453.9	110.6	115.8	118.8	151.7	143.1	232.4	208.5
3	5.29	465.47	457.6	108.4	112.7	117.1	151.7	142.6	231.5	210.3
4	5.30	470.74	461.3	108.0	112.3	116.2	148.3	144.4	232.4	213.3
5	5.31	472.31	462.3	109.3	111.4	114.5	151.3	147.0	234.1	214.6
6	5.32	473.89	464.9	107.1	111.0	116.6	153.0	147.4	233.2	215.0

FR	PTC	IC P47/PTC	PORT-22 NO	PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	458.1	205.9	0.0341	5.11	5 0.87645	6 0.91025	11 0.93655	16 0.92852	23 0.93947	29 0.94693	34 2.75778	35 0.98404
2	463.9	209.4	0.0334	5.13	4 0.79117	7 0.92925	12 0.94093	17 0.92632	24 1.01250	30 0.99134	41 0.74804	36 1.12722
3	465.4	211.3	0.0337	5.10	3 1.02787	8 1.02933	13 0.95993	18 0.97162	25 0.92798	31 1.01107	42 2.31289	37 1.04248
4	470.2	213.7	0.0333	5.10	2 1.39241	9 1.02568	14 0.92559	19 0.96650	26 0.98834	32 0.99426	39 0.71447	38 1.05271
5	472.8	215.0	0.0331	5.09	1 1.44793	10 0.96477	15 0.9387*	20 1.01637	27 0.93363	33 1.01107	40 0.76414	43 0.72396
6	472.3	216.3	0.0333	5.09				21 0.99938	28 0.94751			

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WIND TUNNEL TEST CONDITIONS..... G 7.752 PT 17.998 PS 5.295 R/L 5.3 KACH 1.446 TMRP 104.4
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 466.9 TC= 211.8 PTC/PSA= 88.18 FSH(22)/PSA= 0.6641
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 60. HEATER TOTAL TEMPERATURE= 260.

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05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 416/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.41	480.21	469.2	91.0	91.0	94.5	150.4	117.5	197.3
2	7.41	479.68	471.8	89.7	91.5	95.8	152.6	119.2	198.6
3	7.41	487.85	478.1	91.0	91.0	95.4	152.2	122.7	200.3
4	7.41	489.68	480.2	90.6	90.6	96.2	151.3	125.7	202.0
5	7.41	486.53	478.6	90.6	91.5	97.1	150.0	127.9	203.3
6	7.41	493.37	482.3	93.2	94.1	98.0	150.4	131.8	205.1

FR	PTC	TC P47/PTC	PORT-22 NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO
1	480.7	198.1	0.0328	6.78	5 0.98080	6 0.99447	11 0.97284	16 1.00337	23 0.92141	29 1.04617	34 1.95557	35 1.15163			
2	479.2	199.8	0.0330	6.77	4 0.77993	7 0.97465	12 0.96839	17 1.05348	24 1.00806	38 1.01642	41 0.68074	36 1.00754			
3	486.8	200.7	0.0327	6.76	3 0.95690	8 0.98718	13 0.95968	18 1.01694	25 0.92245	31 0.99345	42 1.53376	37 1.02842			
4	489.7	202.5	0.0325	6.77	2 1.30093	9 0.98823	14 1.00702	19 1.01485	26 0.99554	32 0.99919	39 0.66456	38 0.93550			
5	483.9	203.8	0.0329	6.75	1 1.34896	10 0.96839	15 1.00441	20 1.00598	27 1.02164	33 0.99136	40 0.78163	43 0.68388			
6	496.8	205.5	0.0321	6.77											

21 0.98092 28 1.02842

WIND TUNNEL TEST CONDITIONS..... 0 7.482 PT 17.998 PS 7.409 R/L 5.4 MACH 1.201 TEMP 104.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 485.9 TC= 201.6 PTC/PSA= 65.58 PSH(22)/PSA= 0.9130
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 750.

A-226

05 SEPTEMBER 1973

HSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 417/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING	FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	904.95	881.8	103.2	105.3	108.0	151.3	129.2	235.8	208.5
2	7.41	901.79	881.8	102.3	106.2	107.5	152.6	131.3	233.2	212.0
3	7.41	919.68	899.2	102.3	105.3	107.5	147.8	136.1	234.1	215.9
4	7.42	917.05	906.0	100.6	103.6	106.7	148.3	140.5	234.5	211.5
5	7.41	923.37	904.4	101.9	104.0	106.7	148.3	143.5	235.0	220.2
6	7.41	928.63	911.3	102.3	104.0	107.1	152.6	146.5	235.0	221.1

A-227

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	908.1	209.4	0.0227	6.83	5 0.89865	6 0.99624	11 0.96806	16 1.00303	23 0.92109	29 1.04373	34 1.96117	35 1.14602			
2	899.7	212.0	0.0229	6.83	4 0.76923	7 0.97485	12 0.96597	17 1.05000	24 1.00146	30 1.01712	41 0.80941	36 1.00877			
3	917.6	216.3	0.0226	6.83	3 0.95971	8 0.98424	13 0.94040	18 1.01921	25 0.92475	31 0.99937	42 1.50037	37 1.02547			
4	912.8	218.9	0.0228	6.83	2 1.30310	9 0.98633	14 1.00616	19 1.01503	26 0.99468	32 0.99572	39 0.80159	38 0.93675			
5	922.8	221.5	0.0226	6.84	1 1.35111	10 0.97015	15 1.00511	20 1.00668	27 1.02129	33 0.98948	40 0.91222	43 0.81724			
6	929.2	222.8	0.0226	6.84											

WIND TUNNEL TEST CONDITIONS..... 0 7.412 18.000 PS 7.412 R/L 5.4 MACH 1.201 TEMP 104.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 HULL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 91.10 TC= 216.8 PTC/PSA= 123.46 PSM(221)/PSA= 0.9220
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 250.

05 SEPTEMBER 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 418/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	1298.10	1274.4	106.2	109.7	112.3	151.3	134.8	238.0	217.6
2	7.41	1303.89	1283.9	105.8	108.8	111.0	150.0	140.0	236.7	221.1
3	7.41	1303.37	1276.0	104.0	107.1	110.6	152.6	144.8	237.1	223.7
4	7.42	1311.79	1281.3	104.0	108.0	111.0	152.6	147.8	238.0	226.7
5	7.42	1328.63	1299.2	104.5	107.1	110.6	148.3	153.0	239.7	225.0
6	7.41	1321.79	1291.3	104.5	105.8	110.1	148.3	156.5	240.2	229.8

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA					
1	1297.6	218.5	0.0192	6.99	5	0.89798	6	1.00286	11	0.96738	16	1.00547	23	0.92146	29	1.04251	34	1.96189	35	1.14478
2	1302.3	222.0	0.0192	6.98	4	0.77380	7	0.98616	12	0.96738	17	1.05191	24	1.00181	30	1.01642	41	0.98842	36	1.00808
3	1302.8	224.1	0.0192	6.99	3	0.95799	8	0.99190	13	0.93711	18	1.02060	25	0.92383	31	1.00547	42	1.46985	37	1.02582
4	1313.9	226.7	0.0192	7.00	2	1.30184	9	0.98929	14	1.00547	19	1.01747	26	0.99399	32	0.99294	39	0.89433	38	0.94651
5	1328.1	229.3	0.0190	7.00	1	1.35245	10	0.97729	15	1.00338	20	1.00964	27	1.01983	33	0.99834	40	1.06217	43	0.90737
6	1331.8	230.6	0.0190	7.01							21	0.98460	28	1.02634						

WIND TUNNEL TEST CONDITIONS..... 0 7.485 PT 18.004 PS 7.413 R/L 5.4 MACH 1.201 TEMP 103.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1312.6 TC= 225.2 PTC/PSA= 177.09 PSM(22)/PSA= 0.9436
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 260.

A-228

TEST 575 RUN 419/C

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FARENHEIT--					MODEL-STING FEED	R-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	1689.68	1656.0	111.9	116.2	117.5	150.0	147.8	240.2	228.5
2	7.41	1701.79	1673.4	113.2	115.3	117.9	152.6	153.9	241.0	230.2
3	7.41	1652.84	1619.2	111.4	113.6	116.2	150.0	158.2	242.3	231.5
4	7.41	1592.84	1560.7	111.0	113.2	116.2	152.2	160.8	241.5	228.5
5	7.39	1541.26	1512.8	108.8	112.3	114.9	150.0	163.9	239.7	225.9
6	7.39	1484.42	1452.3	109.7	111.0	114.9	148.7	165.2	236.7	222.8

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	1692.3	229.3	0.0173	7.25	5	0.89479	6	1.80508	11	0.96849	16	1.00664	23	0.92354	29	1.04375	34	1.96572	35	1.14358
2	1693.4	231.5	0.0172	7.26	4	0.77249	7	0.98268	12	0.96981	17	1.85577	24	1.00089	30	1.02876	41	0.99462	36	1.01239
3	1661.3	231.9	0.0174	7.23	3	0.95699	8	0.98678	13	0.93922	18	1.02441	25	0.92406	31	1.01605	42	1.44934	37	1.02650
4	1594.9	229.8	0.0178	7.20	2	1.30299	9	0.98940	14	1.80351	19	1.01710	26	0.99305	32	0.98835	39	0.95908	38	0.98535
5	1541.8	227.2	0.0179	7.14	1	1.34794	10	0.97581	15	1.00194	20	1.01135	27	1.01919	33	0.99844	40	1.17964	43	0.95751
6	1484.9	223.7	0.0182	7.10									21	0.98678	28	1.02076				

WIND TUNNEL TEST CONDITIONS..... Q 7.488 PT 18.004 PS 7.401 R/L 5.4 MACH 1.202 TEMP 103.3
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1611.4 TC= 228.9 PTC/PSA= 217.74 PSM(22)/PSA= 0.0722
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 260.

05 SEPTEMBER 1973

 NSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PL E TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 426/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING	FFEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.58	1664.42	1633.4	113.2	115.3	116.2	151.7	145.2	237.1	223.7
2	10.57	1700.21	1669.7	110.6	114.5	114.9	152.6	148.7	236.3	225.9
3	10.58	1683.37	1643.4	111.0	113.2	114.9	152.2	153.9	237.6	227.6
4	10.59	1631.79	1601.8	109.7	111.9	113.6	150.4	157.4	237.1	227.2
5	10.59	1573.37	1547.6	110.6	112.3	113.6	152.6	160.8	236.3	224.1
6	10.59	1519.68	1491.8	108.8	111.0	113.2	151.3	162.6	234.1	221.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1664.4	225.8	0.0175	10.58	5	0.99887	6	0.98498	11	0.95983	16	0.98937	23	0.96123	29	1.03359	34	1.37825	35	1.04931
2	1694.9	227.6	0.0172	10.58	4	0.95538	7	0.96488	12	0.96561	17	1.03359	24	0.96781	30	1.01459	41	1.00399	36	1.04456
3	1690.2	229.3	0.0172	10.58	3	0.88374	8	0.99193	13	0.97548	18	1.01166	25	0.95319	31	1.02117	42	1.01624	37	1.03359
4	1635.5	228.8	0.0175	10.53	2	1.09178	9	0.98389	14	0.97987	19	1.01130	26	0.97146	32	1.00289	39	0.98498	38	1.01641
5	1571.8	225.8	0.0178	10.48	1	1.15274	10	0.96927	15	0.99229	20	1.00728	27	0.99924	33	1.00545	40	1.07818	43	0.99156
6	1519.7	222.8	0.0188	10.41									21	0.99924	28	1.00216				

WIND TUNNEL TEST CONDITIONS..... 0 6.063 PT 17.994 PS 10.583 R/L 9.1 MACH 0.905 TEMP 103.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1629.4 TC= 226.2 PTC/PSA= 153.96 PSH(221)/PSA= 0.9946
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 260.

A-230

05 SEPTEMBER 1973

MSFC TRIBONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 42170

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEED-R-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.56	1275.47	1257.1	111.9	114.9	115.8	147.8	144.4	235.8	219.8
2	10.60	1291.79	1262.8	111.4	114.5	115.8	150.8	148.3	235.8	222.4
3	10.56	1306.80	1274.9	110.6	112.7	114.9	147.8	152.2	235.4	224.6
4	10.56	1322.84	1295.5	110.6	112.3	114.5	147.8	155.2	236.3	226.7
5	10.56	1334.42	1302.3	109.3	111.4	114.0	148.3	157.8	236.7	226.3
6	10.56	1338.63	1313.4	108.8	110.6	114.0	153.0	160.8	235.8	226.3

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1272.3	220.2	0.0196	10.15	5 0.99931	6 0.98430	11 0.95721	16 0.98247	23 0.96124	29 1.02420	34 1.37890	35 1.04653				
2	1294.9	223.7	0.0193	10.17	4 0.95984	7 0.96966	12 0.96746	17 1.03042	24 0.97149	30 1.00810	41 0.95562	36 1.04277				
3	1307.1	225.9	0.0192	10.18	3 0.88291	8 0.99162	13 0.97259	18 1.00370	25 0.95026	31 1.00883	42 1.01651	37 1.02567				
4	1321.8	226.0	0.0191	10.17	2 1.09155	9 0.98284	14 0.97508	19 1.00041	26 0.96746	32 0.98906	39 0.94440	38 0.98686				
5	1339.7	226.3	0.0189	10.18	1 1.15232	10 0.96710	15 0.98860	20 0.99602	27 0.99565	33 0.98869	40 1.02493	43 0.96197				
6	1340.2	226.7	0.0189	10.19				21 0.98760	28 0.99821							

WIND TUNNEL TEST CONDITIONS..... Q 6.082 PT 18.087 PS 10.567 R/L 5.1 MACH 0.907 TEMP 102.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1312.7 IC= 225.1 PTC/PSA= 124.22 PSM(22)/PSA= 0.627
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 250.

A-231

05 SEPTEMBER 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 422/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE			TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)				
1	10.62	888.10	874.4	111.0	113.2	114.5	148.3	136.6	238.0	211.1	
2	10.60	888.10	870.7	110.1	112.3	114.0	148.7	140.5	236.3	214.6	
3	10.59	901.26	888.1	110.1	111.9	113.6	150.4	143.9	235.8	216.8	
4	10.58	908.18	887.1	108.4	110.6	112.7	152.6	146.1	234.1	217.6	
5	10.60	908.63	891.8	107.5	109.7	111.9	150.4	148.3	234.1	218.5	
6	10.59	984.95	887.1	109.3	110.1	112.7	152.2	152.2	234.1	219.4	

FR	PTC	TC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	
1	886.8	212.4	0.8231	9.65	5	1.00038	6	0.98014	11	0.95841	16	0.97884	23	0.96286	29	1.01753	34	1.37337	35	1.04819
2	886.8	215.0	0.8231	9.66	4	0.95585	7	0.96688	12	0.96388	17	1.02300	24	0.96899	30	0.99819	41	0.88687	36	1.03541
3	899.2	217.2	0.8229	9.65	3	0.88432	8	0.99816	13	0.96935	18	0.99388	25	0.94855	31	0.99271	42	1.00585	37	1.01534
4	918.2	219.4	0.8227	9.66	2	1.00979	9	0.98249	14	0.97227	19	0.98878	26	0.96388	32	0.97446	39	0.87888	38	0.93943
5	909.2	219.4	0.8228	9.66	1	1.15111	10	0.98716	15	0.98432	20	0.97957	27	0.99089	33	0.96286	40	0.91109	43	0.89673
6	906.5	220.7	0.8229	9.67									21	0.98896	28	0.99271				

WIND TUNNEL TEST CONDITIONS..... 0 6.062 PT 18.084 PS 18.598 R/L 5.1 MACH 0.984 TEMP 102.4
 MODEL ATTITUDE..... ALPHA 0.82 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 899.5 TC= 217.3 PTC/PSA= 84.87 PSN1221/PSA= 0.9114
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 295.

05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 423/0

ORIGINAL PAGE IS
OF POOR QUALITY

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODFL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.64	477.58	470.2	108.8	111.9	114.0	151.7	132.2	260.8	217.4
2	10.63	476.53	467.1	108.0	111.4	112.3	151.7	135.3	264.9	215.5
3	10.64	475.47	468.1	108.8	110.1	111.4	147.8	137.9	260.8	218.9
4	10.65	477.05	468.6	108.4	110.2	111.9	150.9	140.9	260.5	221.5
5	10.66	478.10	469.7	107.1	109.3	111.0	150.9	142.6	257.5	222.4
6	10.66	482.31	475.5	107.1	108.4	110.6	151.3	144.8	256.2	223.7

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	476.5	213.3	0.0330	9.19	5 0.99906	6 0.98417	11 0.95692	16 0.97363	23 0.96055	29 1.00960	34 1.00527				
2	476.0	215.9	0.0331	9.17	4 0.95365	7 0.96419	12 0.96092	17 1.01505	24 0.96600	30 0.98889	41 0.78617	36 0.82958			
3	473.9	218.9	0.0332	9.19	3 0.88753	8 0.99034	13 0.96891	18 0.98780	25 0.94966	31 0.98308	42 0.98817	37 1.00515			
4	477.1	222.0	0.0331	9.20	2 1.00807	9 0.98272	14 0.97036	19 0.98163	26 0.96273	32 0.96491	39 0.96692	38 0.89516			
5	478.1	222.8	0.0331	9.21	1 1.14874	10 0.96855	15 0.98235	20 0.97008	27 0.98926	33 0.94421	40 0.78763	43 0.80761			
6	480.7	224.6	0.0330	9.21				21 0.94493	28 0.99034						

WIND TUNNEL TEST CONDITIONS..... Q 6.030 PT 18.006 PS 10.647 R/L 5.1 MACH 0.900 TEMP 102.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 477.1 TC= 219.6 PTC/PSA= 44.81 PSM(22)/PSA= 0.8638
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 260.

A-233

05 SEPTEMBER 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 975 RUN 425/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.57	1000.74	979.7	101.4	101.4	102.3	147.8	104.5	119.7	81.5
2	10.56	1004.42	983.9	99.7	101.4	101.9	146.7	101.8	99.3	71.5
3	10.57	1020.63	1008.6	101.4	101.4	102.3	151.3	99.3	84.1	64.2
4	10.56	1024.42	1004.4	100.1	100.6	100.6	147.8	94.9	69.8	56.4
5	10.59	1029.16	1009.7	101.0	101.0	100.6	150.9	91.9	59.8	50.7
6	10.60	1044.42	1026.0	98.0	99.7	99.7	152.6	87.1	50.3	46.0

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1001.8	85.7	0.0217	9.02	5 0.99911	6 0.98448	11 0.95524	16 0.97937	23 0.96072	29 1.02068	34 1.36987	35 1.04773			
2	1004.4	75.3	0.0217	9.02	4 0.95560	7 0.96474	12 0.96182	17 1.02368	24 0.96694	30 1.00167	41 0.91393	36 1.03640			
3	1027.6	66.3	0.0214	9.00	3 0.88249	8 0.99033	13 0.97059	18 0.99874	25 0.94982	31 1.00788	42 0.98598	37 1.02104			
4	1023.4	57.7	0.0215	9.09	2 1.09233	9 0.98389	14 0.97461	19 0.99691	26 0.96621	32 0.97461	39 0.90771	38 0.96255			
5	1029.2	52.0	0.0215	9.93	1 1.15265	10 0.96077	15 0.98014	20 0.98668	27 0.99509	33 0.97242	40 0.95788	43 0.93221			
6	1042.0	46.8	0.0212	9.95				21 0.97498	28 0.99038						

WIND TUNNEL TEST CONDITIONS..... 0 6.069 PY 10.000 PS 10.581 R/L 5.1 MACH 0.905 TEMP 101.8
 MODEL ATTITUDE..... ALPHA 2.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1021.5 TC= 63.3 PTC/PSA= 96.55 PSH(22)/PSA= 0.9340
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 8.

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05 SEPTEMBER 1973

MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 430/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCW
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.37	983.37	966.5	91.0	90.6	90.2	150.4	88.0	63.7	62.9
2	7.38	990.74	970.2	91.0	89.7	89.7	147.8	85.4	57.2	57.2
3	7.39	995.47	974.9	91.0	89.7	89.7	148.3	83.7	51.2	52.5
4	7.38	1002.84	981.8	90.6	90.2	89.7	150.4	81.1	46.0	48.1
5	7.39	1000.21	981.8	89.7	90.2	89.7	147.8	78.5	40.8	44.2
6	7.38	1013.89	993.4	91.0	90.2	89.3	151.3	77.2	37.3	41.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	983.4	64.2 0.0219	6.88	5 0.89916	6 1.00291	11 0.96319	16 1.00763	23 0.93060	29 1.04274	34 1.95290	35 1.14387				
2	990.2	59.8 0.0219	6.88	4 0.76188	7 0.98405	12 0.96910	17 1.04745	24 0.99767	30 1.02335	41 0.85620	36 1.00501				
3	994.9	53.8 0.0219	6.89	3 0.95942	8 0.99453	13 0.94056	18 1.02754	25 0.92379	31 1.03226	42 1.33774	37 1.02911				
4	1002.8	49.4 0.0217	6.89	2 1.30263	9 0.99925	14 0.99558	19 1.02230	26 0.99715	32 0.98353	39 0.84781	38 0.93794				
5	1000.7	45.1 0.0218	6.89	1 1.34560	10 0.97671	15 1.00134	20 1.01759	27 1.02282	33 0.98615	40 0.95471	43 0.86510				
6	1013.4	42.5 0.0216	6.91				21 0.98981	28 1.02544							

WIND TUNNEL TEST CONDITIONS..... Q 7.493 PT 18.004 PS 7.382 R/L 5.5 MACH 1.204 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 997.6 TC= 52.3 PTC/PSA= 135.14 PSM(22)/PSA= 0.9333
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 0.

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07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 438/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-P/PE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1037.61	1018.1	80.2	81.9	85.8	150.4	100.0	JA1.9	161.7
2	1.21	1042.34	1021.3	80.2	81.5	84.5	143.1	112.7	JA1.2	137.4
3	1.21	1053.39	1028.1	79.3	81.1	85.0	150.0	113.6	204.2	118.4
4	1.21	1047.61	1029.2	78.9	80.6	84.1	148.7	113.2	127.0	100.6
5	1.21	1055.50	1034.4	79.8	79.8	84.5	148.7	110.6	143.1	76.7
6	1.21	1067.61	1046.6	79.3	79.8	85.0	151.3	108.0	160.0	72.4

FR	PTC	IC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1037.6	161.7	0.0214	1.28	5 0.85134	6 0.88830	11 0.95394	16 0.99472	23 0.95964	29 0.90997	34 3.82276	35 0.72645			
2	1041.8	141.8	0.0214	1.30	4 0.80291	7 0.90487	12 1.01129	17 0.92080	24 1.00428	30 0.96286	41 1.37005	36 0.93402			
3	1048.7	119.7	0.0213	1.31	3 1.47201	8 0.94119	13 1.01511	18 1.00810	25 0.98771	31 1.16231	42 3.82276	37 1.21775			
4	1047.6	101.9	0.0213	1.33	2 2.57124	9 1.02821	14 0.97752	19 1.01129	26 0.95203	32 0.97114	39 1.36750	38 0.96923			
5	1056.0	87.6	0.0212	1.34	1 2.57633	10 0.98899	15 1.02658	20 1.05207	27 0.99600	33 0.96668	40 3.82276	43 1.35858			
6	1068.1	74.6	0.0210	1.36				21 1.06163	28 0.97752						

WIND TUNNEL TEST CONDITIONS..... Q 10.287 PT 89.998 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE NOUZZLE PARAMETERS.. PTC= 1050.0 TC= 114.5 PTC/PSA= 864.89 PSM(22)/PSA= 1.0881
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 0.

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07 SEPTEMBER 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 438/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	997.61	982.9	143.5	154.3	166.0	147.8	183.4	473.0	215.5
2	1.21	1005.50	988.1	140.0	151.7	163.4	150.4	184.2	397.1	167.2
3	1.21	1002.34	986.6	139.2	149.1	160.8	148.3	183.4	137.4	162.4
4	1.21	1010.24	992.3	137.0	146.1	158.7	148.7	179.0	142.6	138.7
5	1.21	1014.45	996.0	134.8	143.9	156.1	150.4	173.0	143.1	117.5
6	1.21	1015.50	996.6	133.1	141.8	153.9	150.0	165.6	136.6	101.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	997.6	210.3	0.0218	1.31	5	0.59878	6	0.88734	11	0.96569	16	1.00009	23	0.96505	29	0.91282	34	8.53258	35	0.71535								
2	1006.6	188.6	0.0217	1.32	4	0.88867	7	0.98326	12	1.01283	17	0.92619	24	1.00900	30	0.96123	41	1.35999	36	0.93065								
3	1004.4	163.9	0.0218	1.33	3	1.47465	8	0.95422	13	1.02238	18	1.00773	25	0.99435	31	1.38292	42	7.10252	37	1.98170								
4	1011.3	140.5	0.0216	1.35	2	2.57347	9	1.02365	14	0.99180	19	1.01856	26	0.95804	32	0.84211	39	1.35362	38	0.98098								
5	1014.4	119.7	0.0216	1.36	1	2.57793	10	0.99817	15	1.03448	20	1.07334	27	1.00072	33	0.97333	40	4.11819	43	1.32368								
6	1015.0	102.7	0.0216	1.38									21	1.07589	28	0.98225												

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.031 PS 1.214 R/L 10.6 MACH 3.480 TFMP 101.6
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1008.2 TC= 155.3 PTC/PSA= 630.19 PSM(22)/PSA= 1.1031
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 0.

07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 440/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	452.87	447.6	119.7	127.9	137.4	151.3	169.9	552.3	342.9
2	1.21	451.29	444.4	117.5	125.7	134.8	150.4	179.0	532.3	351.1
3	1.21	494.97	449.7	115.3	124.0	132.7	148.3	187.7	517.2	353.7
4	1.21	457.08	449.7	112.7	122.7	131.8	152.6	196.8	504.6	362.0
5	1.21	460.24	453.9	113.2	123.6	130.9	152.2	203.3	494.2	365.9
6	1.21	460.24	453.9	112.3	120.1	129.2	152.2	211.1	485.1	369.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	451.3	342.9	0.0343	1.22	5	0.85362	6	0.88993	11	0.96255	16	0.99886	23	0.96382	29	0.91477	34	1.90603	35	0.73322
2	451.8	351.1	0.0344	1.22	4	0.80839	7	0.90394	12	1.01415	17	0.93516	24	1.00650	30	0.96781	41	0.95236	36	0.93898
3	452.9	358.1	0.0343	1.22	3	1.48236	8	0.94662	13	1.01861	18	1.01096	25	0.98994	31	0.98994	42	9.78473	37	1.58237
4	458.7	362.8	0.0340	1.23	2	2.58569	9	1.01924	14	0.98484	19	1.01797	26	0.95889	32	0.96000	39	0.93643	38	1.02816
5	461.8	366.3	0.0338	1.23	1	2.99525	10	0.99185	15	1.03871	20	1.02243	27	1.00268	33	0.96864	40	1.87286	43	0.90585
6	460.2	369.8	0.0339	1.23									21	1.02498	28	0.98994				

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.027 PS 1.214 R/L 10.6 MACH 3.480 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 456.1 TC= 358.5 PTC/PSA= 375.99 PSM(22)/PSA= 1.0083
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 460.

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07 SEPTEMBER 1973

MSFC TRANSONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 441/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	905.50	889.2	94.9	96.7	97.5	153.0	146.5	348.1
2	1.21	920.76	902.9	93.6	95.4	97.1	152.2	163.0	355.0
3	1.21	926.03	909.2	93.6	94.5	96.7	150.4	177.7	360.2
4	1.21	921.29	908.1	94.5	94.1	97.1	150.4	191.2	362.8
5	1.21	930.13	925.5	91.9	93.2	97.1	153.5	202.5	365.4
6	1.21	950.24	936.0	92.8	93.2	97.1	151.7	213.3	368.1

FR	PTC	IC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	903.9	348.5	0.0228	1.25	5	0.62623	6	0.88615	11	0.95367	16	0.99572	23	0.96068	29	0.91226	34	1.87155	35	0.73325
2	919.7	355.0	0.0225	1.25	4	0.80779	7	0.90207	12	1.00846	17	0.93775	24	1.00480	30	0.96323	41	1.25819	36	0.93711
3	925.0	360.2	0.0225	1.26	3	1.48625	8	0.93966	13	1.01292	18	1.00719	25	0.98807	31	0.98680	42	1.25601	37	1.26137
4	918.1	363.3	0.0228	1.26	2	2.59919	9	1.01610	14	0.97597	19	1.01165	26	0.95304	32	0.95495	39	1.24226	38	1.02036
5	904.4	365.9	0.0225	1.27	1	2.60381	10	0.98616	15	1.02502	20	1.01674	27	0.99890	33	0.95750	40	3.69811	43	1.22124
6	948.1	368.1	0.0223	1.27									21	1.01993	28	0.98744				

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.023 PS 1.214 R/L 10.6 MACH 3.480 TEMP 101.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 924.9 TC= 360.2 PTC/PSA= 761.64 PSM(22)/PSA= 1.0380
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 430.

07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 577 RUN 442/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---							MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)				
1	1.21	1228.66	1202.3	125.7	135.3	143.1	148.3	184.2	499.4	355.0	
2	1.21	1213.92	1191.3	122.7	130.1	141.8	151.7	199.8	470.8	357.2	
3	1.21	1224.45	1204.4	121.4	131.4	139.2	150.4	210.7	447.8	360.2	
4	1.21	1238.66	1218.8	121.0	130.5	137.9	150.4	222.4	433.9	363.3	
5	1.21	1228.66	1205.5	120.1	128.8	137.0	151.3	232.4	424.4	365.0	
6	1.21	1237.41	1216.6	118.8	127.5	135.7	150.9	248.6	417.0	366.3	

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1229.7	355.8	0.0196	1.33	5 0.85967	6 0.89217	11 0.96482	16 1.00178	23 0.96609	29 0.91575	34 11.92956	35 0.72639			
2	1214.4	357.6	0.0198	1.33	4 0.81442	7 0.98428	12 1.81389	17 0.93996	24 1.00751	30 0.96545	41 1.44659	36 0.93678			
3	1221.8	360.2	0.0198	1.34	3 1.49438	8 0.94697	13 1.01898	18 1.01070	25 0.99094	31 0.99094	42 10.86533	37 1.70404			
4	1241.3	364.1	0.0195	1.34	2 2.60832	9 1.01835	14 0.98521	19 1.01516	26 0.95781	32 0.95844	39 1.39879	38 1.03237			
5	1233.4	365.9	0.0197	1.35	1 2.61214	10 0.99894	15 1.02018	20 1.01962	27 1.00178	33 0.96899	40 4.79859	43 1.38159			
6	1238.1	366.3	0.0198	1.35				21 1.02281	28 0.98967						

WIND TUNNEL TEST CONDITIONS..... 0 10.287 PT 89.994 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.9
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1229.8 TC= 361.5 PTC/PSA= 1013.06 PSM(22)/PSA= 1.1037
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1686. HEATER TOTAL TEMPERATURE= 425.

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07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 443/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1668.66	1631.3	81.1	81.9	82.4	147.8	139.2	476.9	361.1
2	1.21	1684.97	1644.4	80.2	81.5	81.9	150.9	162.1	490.6	365.4
3	1.21	1683.40	1652.9	81.1	81.5	81.5	148.3	162.1	434.8	370.2
4	1.21	1652.34	1626.0	81.1	81.5	82.8	147.8	199.0	425.3	371.5
5	1.21	1606.03	1570.8	81.9	81.9	83.7	152.2	213.7	419.2	369.8
6	1.21	1520.76	1493.4	81.5	81.9	84.1	148.3	229.0	413.1	368.9

FR	PTC	IC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1668.7	361.1	0.0174	1.40	5	0.86489	6	0.88958	11	0.95521	16	0.99663	23	0.96605	29	0.91188	34	1.84298	35	0.72900						
2	1690.8	365.4	0.0173	1.41	4	0.82076	7	0.90615	12	1.01193	17	0.94438	24	1.00810	30	0.96541	41	1.68230	36	0.93928						
3	1690.8	370.7	0.0173	1.42	3	1.50769	8	0.94119	13	1.01639	18	1.01320	25	0.99217	31	0.98835	42	1.31089	37	1.20437						
4	1648.7	371.5	0.0176	1.43	2	2.63241	9	1.01766	14	0.97879	19	1.01894	26	0.95776	32	0.95967	39	1.56441	38	1.04634						
5	1608.1	370.2	0.0177	1.42	1	2.62986	10	0.98707	15	1.02913	20	1.02340	27	1.00428	33	0.96222	40	5.35595	43	1.55740						
6	1527.1	369.8	0.0182	1.41																						

WIND TUNNEL TEST CONDITIONS..... 0 10.287 PT 89.998 PS 1.214 R/L 10.7 MACH 3.480 TEMP 100.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 8.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1639.0 TC= 368.1 PTC/PSA= 1350.09 PSM(27)/PSA= 1.1670
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 430.

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06 SEPTEMBER 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 444/1

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.12	1670.74	1638.6	117.5	122.3	122.3	148.7	194.2	470.8	395.4
2	5.11	1700.74	1667.1	114.5	120.5	121.0	148.7	208.5	458.7	399.7
3	5.10	1676.01	1646.0	114.0	118.8	120.5	150.0	222.0	450.8	401.4
4	5.09	1649.69	1618.1	113.2	117.9	120.1	150.4	232.4	446.1	399.7
5	5.12	1578.11	1543.4	113.2	117.1	119.2	150.4	241.9	443.5	398.4
6	5.12	1529.69	1502.3	114.5	116.2	119.2	152.6	248.8	438.7	395.8

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	1671.3	395.4	0.0175	5.80	5	0.98569	6	0.91898	11	0.93065	16	0.96478	23	0.93519	29	1.00253	34	2.80937	35	0.92006
2	1699.7	399.7	0.0173	5.81	4	0.81262	7	0.92536	12	0.90644	17	0.97000	24	0.97000	30	1.07744	41	1.17051	36	1.17353
3	1673.4	401.4	0.0175	5.80	3	1.04188	8	1.08556	13	0.96546	18	1.01691	25	0.94579	31	1.09409	42	1.83407	37	1.13873
4	1650.2	408.1	0.0174	5.78	2	1.40355	9	1.00480	14	0.99194	19	1.04869	26	0.89812	32	1.08576	39	1.13116	38	1.21288
5	1585.0	398.8	0.0178	5.76	1	1.41111	10	0.98211	15	0.98135	20	1.10695	27	0.95184	33	1.10544	40	1.67972	43	1.12889
6	1531.3	396.7	0.0179	5.72																
																		</		

WIND TUNNEL TEST CONDITIONS..... Q 7.743 PT 18.004 PS 5.112 R/L 5.3 MACH 1.471 TEMP 98.6
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1635.1 TC= 398.7 PTC/PSA= 319.85 PSH(22)/PSA= 1.1300
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 460.

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TEST 575 RUN 44570

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.17	1290.74	1270.7	124.0	129.2	133.5	152.6	195.1	496.8	388.9
2	5.16	1297.06	1270.2	120.1	127.0	132.2	151.3	209.0	478.2	392.8
3	5.16	1343.90	1318.1	120.1	125.3	130.5	148.3	219.8	466.5	397.1
4	5.16	1342.32	1315.5	116.4	123.1	129.6	149.1	228.5	456.5	397.1
5	5.18	1314.95	1288.6	117.1	122.3	129.2	152.2	237.6	458.8	397.5
6	5.17	1340.74	1318.1	117.1	121.4	128.8	150.4	244.5	444.8	398.4

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1289.7	390.2	0.0195	5.15	5 0.87733	6 0.90128	11 0.97165	16 0.91101	23 0.95368	29 1.16777	34 2.79143	35 0.96266			
2	1307.1	392.8	0.0193	5.14	4 0.79049	7 0.92973	12 0.93122	17 0.92374	24 1.08533	30 0.98437	41 0.99560	36 1.13109			
3	1348.7	390.0	0.0189	5.16	3 1.02629	8 0.98362	13 0.94994	18 0.93871	25 0.92374	31 1.02150	42 1.74268	37 1.06148			
4	1345.0	397.1	0.0189	5.16	2 1.36764	9 0.99336	14 0.95742	19 0.96716	26 0.88182	32 1.00384	39 0.98063	38 1.08468			
5	1322.8	397.5	0.0193	5.16	1 1.40058	10 0.99186	15 0.94395	20 0.96566	27 0.93796	33 1.00608	40 1.43127	43 0.99485			
6	1340.7	399.3	0.0191	5.16				21 1.01656	28 0.93871						

WIND TUNNEL TEST CONDITIONS.....	Q	7.748	PT	18.084	PS	5.167	R/L	5.3	MACH	1.464	TEMP	100.3
MODEL ATTITUDE.....	ALPHA	0.08	BETA	0.00	ROLL	0.8						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC	1324.3	TC	395.8	PTC/PSA	256.30			PSM(22)	PSA	0.9976	
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1688.					HEATER TOTAL TEMPERATURE= 460.						

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06 SEPTEMBER 1973

MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 446/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	TEMPERATURE DATA SKIN(3)	DEGREES FAHRFNHEIT SKIN(4)	SKIN(5)	MODEL-STING	FFEDER-PIPE	TCH
1	5.15	903.30	889.7	134.0	144.8	152.2	152.2	218.1	626.0	433.1
2	5.17	910.64	901.8	130.5	140.9	150.0	151.7	238.6	592.6	433.9
3	5.17	920.74	907.6	127.0	138.7	147.4	152.2	240.6	566.2	433.1
4	5.15	933.90	916.5	126.6	136.6	145.7	151.3	250.1	544.1	430.5
5	5.17	936.81	918.1	126.6	134.4	144.8	147.8	257.5	526.3	429.2
6	5.15	927.59	911.3	126.6	133.1	143.1	148.7	263.1	511.5	426.6

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	903.4	433.9	0.0229	5.03	0.87668	6 0.89466	11 0.96385	16 0.91265	23 0.95086	29 0.89766	34 2.79713	35 0.96135	
2	917.6	433.9	0.0228	5.02	0.88325	7 0.93213	12 0.93662	17 0.92388	24 1.01455	30 0.99956	41 0.89841	36 1.13219	
3	918.1	433.1	0.0228	5.02	1.03028	8 1.00256	13 0.95610	18 0.95011	25 0.92988	31 1.02654	42 1.70016	37 1.06475	
4	932.8	430.5	0.0225	5.02	1.37196	9 0.99507	14 0.94936	19 0.96959	26 0.89017	32 1.00706	39 0.88567	38 1.08573	
5	937.6	428.7	0.0225	5.02	1.40269	10 0.99357	15 0.94037	20 0.98158	27 0.93662	33 1.01305	40 1.12020	43 0.89766	
6	929.2	427.0	0.0227	5.02				21 1.02354	28 0.94037				

WIND TUNNEL TEST CONDITIONS..... 0 7.746 PT 18.002 PS 5.162 R/L 5.3 MACH 1.464 TFMP 100.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 923.1 TC= 431.2 PTC/PSA= 178.82 PSM(22)/PSA= 0.9728
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 460.

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

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WIND TUNNEL TEST CONDITIONS..... 0 7.793 PT 18.002 PS 5.275 R/L 5.3 MACH 1.449 TEMP 100.4
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 507.4 TC= 447.5 PTC/PSA= 96.20 PSM(22)/PSA= 0.9566
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 480.
  
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06 SEPTEMBER 1973

NSFC TRISONIC WIND TUNNEL MUNTSSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 447/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	4.97	473.38	466.5	98.8	100.6	101.4	151.3	137.4	577.9	340.3
2	4.96	480.22	475.0	98.0	99.3	100.6	150.4	146.5	553.6	347.2
3	4.99	480.74	473.9	96.2	98.4	100.6	152.2	156.9	535.4	353.3
4	5.00	490.74	482.8	97.1	98.4	100.6	151.3	166.5	525.0	357.6
5	4.97	491.80	484.4	98.0	98.8	100.1	152.2	173.0	505.0	360.2
6	5.00	500.74	493.4	96.2	97.5	99.7	150.9	180.3	492.9	362.4

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	473.4	340.7	0.0334	5.25	5	0.91880	6	0.90713	11	0.94671	16	0.97853	23	0.92809	29	1.11743	34	2.87117	35	0.94981	
2	478.6	347.7	0.0330	5.26	4	0.86626	7	0.96844	12	0.94050	17	1.00103	24	0.96223	30	1.08328	41	0.81867	36	1.21210	
3	480.7	353.7	0.0330	5.25	3	1.00569	8	0.98939	13	0.88851	18	0.98396	25	0.91412	31	1.11277	42	1.90972	37	1.08484	
4	490.2	357.6	0.0325	5.25	2	1.38670	9	1.01267	14	0.92343	19	1.03362	26	0.88075	32	1.11510	39	0.80238	38	1.20899	
5	491.8	360.7	0.0325	5.25	1	1.39523	10	0.98861	15	1.01267	20	1.04216	27	0.93429	33	1.10889	40	0.87299	43	0.82488	
6	501.8	363.3	0.0320	5.23																	

WIND TUNNEL TEST CONDITIONS..... 0 7.728 PT 17.996 PS 4.985 R/L 5.3 MACH 1.488 TEMP 98.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/MOZZLE PARAMETERS.. PTC= 486.1 TC= 354.0 PTC/PSA= 97.52 PSM(22)/PSA= 1.9529
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 800. HEATER TOTAL TEMPERATURE= 440.

06 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 448/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.38	394.42	387.1	123.6	129.6	132.7	150.4	163.4	532.3	327.3
2	7.38	391.26	384.4	122.3	127.5	130.9	147.8	169.9	515.4	333.4
3	7.38	392.84	387.1	121.0	125.7	130.1	150.9	176.9	502.4	338.6
4	7.38	394.95	388.6	120.5	124.9	128.8	151.7	182.1	491.2	342.9
5	7.38	396.53	389.7	118.8	122.7	127.9	151.3	186.4	481.2	345.9
6	7.39	399.16	392.8	117.9	121.4	127.0	152.2	189.9	471.2	348.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	393.4	328.2	0.8376	6.74	5	0.98194	6	1.00578	11	0.96954	16	1.00937	23	0.93181	29	1.04553	34	1.96948	39	1.14458
2	398.2	332.5	0.8379	6.73	1	0.76672	7	0.98422	12	0.97531	17	1.05497	24	0.99941	30	1.02247	41	0.64304	36	1.01252
3	391.3	339.0	0.8377	6.74	3	0.95539	8	0.98946	13	0.94858	18	1.02562	25	0.93076	31	0.99784	42	1.25464	37	1.02509
4	394.4	343.8	0.8375	6.74	2	1.30338	9	1.00046	14	0.99837	19	1.01723	26	0.99313	32	0.99163	39	0.62627	35	0.93286
5	396.0	346.8	0.8374	6.74	1	1.34740	10	0.97583	15	1.00466	20	1.01304	27	1.02352	33	0.99784	40	0.65824	43	0.65195
6	398.6	349.0	0.8373	6.75									21	0.98946	28	1.02771				

WIND TUNNEL TEST CONDITIONS..... Q 7.494 PT 18.004 PS 7.381 R/L 5.4 MACH 1.205 TEMP 102.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 394.0 TC= 339.9 PTC/PSA= 53.38 PSM(22)/PSA= 0.9133
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 460.

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06 SEPTEMBER 1973

 MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 448/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.41	513.38	505.5	118.8	121.8	124.4	152.6	188.3	368.2
2	7.41	519.16	511.3	116.2	120.5	123.6	148.3	187.7	364.6
3	7.39	516.53	508.1	116.2	119.7	122.7	147.8	194.2	367.2
4	7.42	521.88	511.8	115.8	118.8	122.7	151.3	200.7	368.9
5	7.42	525.48	518.1	113.6	117.1	121.8	158.4	205.1	369.8
6	7.39	528.44	521.3	113.6	116.2	122.7	148.3	210.7	370.7

FR	PTC	IC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA				
1	513.4	361.1	0.8315	7.31	5	0.89717	6	0.97812	11	1.08527	16	1.88368	23	1.87003	29	1.13896	34	1.94527	39	1.15463
2	519.2	365.4	0.8312	7.31	4	0.88369	7	1.04914	12	0.99378	17	1.12851	24	1.06324	38	1.08674	41	0.77132	36	1.12799
3	516.0	368.8	0.8315	7.31	3	0.95044	8	1.11912	13	1.08997	18	1.18972	25	0.98438	31	1.08830	42	1.34628	37	1.10502
4	522.3	368.9	0.8312	7.31	2	1.38920	9	1.09666	14	1.08632	19	1.11076	26	1.04078	32	1.09718	39	0.75304	38	1.02877
5	524.4	370.2	0.8312	7.30	1	1.39798	10	1.04705	15	1.08883	20	1.11233	27	1.08413	33	1.08569	40	0.79116	43	0.77550
6	527.6	370.2	0.8311	7.31									21	1.09308	28	1.09485				

WIND TUNNEL TEST CONDITIONS..... 0 7.486 PT 18.004 PS 7.407 R/L 5.5 MACH 1.202 TEMP 99.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 520.5 IC= 367.1 PTC/PSA= 70.27 PSH(22)/PSA= 0.9870
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 440.

05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 449/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.42	876.00	858.6	124.9	130.9	135.3	152.6	186.0	504.2	371.1
2	7.42	886.53	872.8	122.7	128.3	133.1	148.3	197.3	487.3	378.5
3	7.43	899.16	883.9	122.7	127.0	133.1	151.3	207.2	476.9	384.1
4	7.42	919.16	903.9	120.5	124.4	131.8	150.9	215.5	466.5	386.7
5	7.43	929.68	914.4	118.8	123.1	131.8	152.6	223.3	459.5	389.7
6	7.43	938.10	920.7	119.2	122.3	130.9	148.7	230.2	454.8	392.6

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	876.6	372.4	0.0232	6.84	5 0.89714	6 1.00082	11 0.97008	16 1.00759	23 0.92319	29 1.04406	34 1.95787	35 1.14305			
2	883.4	378.5	0.0232	6.83	4 0.77419	7 0.98258	12 0.96747	17 1.06073	24 1.00238	30 1.01905	41 0.88909	36 1.01332			
3	898.1	384.1	0.0230	6.85	3 0.96122	8 0.99717	13 0.94247	18 1.02009	25 0.92735	31 0.99613	42 1.28907	37 1.02739			
4	918.1	387.1	0.0227	6.83	2 1.30612	9 0.99352	14 1.01072	19 1.01801	26 0.99248	32 1.00446	39 0.80597	38 0.94090			
5	927.6	389.7	0.0226	6.84	1 1.35665	10 0.97946	15 1.00811	20 1.00759	27 1.02061	33 0.99509	40 0.92579	43 0.82420			
6	935.5	392.8	0.0225	6.84				21 0.98519	28 1.02999						

WIND TUNNEL TEST CONDITIONS..... 0 7.480 PT 18.002 PS 7.424 R/L 5.5 MACH 1.200 TEMP 101.1
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 906.9 TC= 384.1 PTC/PSA= 122.15 PSM(22)/PSA= 0.9213
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 480.

05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 458/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.44	1280.74	1250.7	124.9	135.7	142.2	152.2	217.2	464.2	406.2
2	7.44	1317.05	1290.7	124.4	133.5	140.5	150.4	228.9	478.2	414.9
3	7.45	1323.37	1299.2	122.7	138.9	139.2	151.3	238.9	473.8	418.3
4	7.45	1324.95	1299.2	123.1	129.6	139.2	152.4	247.5	471.2	421.4
5	7.47	1352.84	1328.2	122.7	128.3	138.3	151.7	256.6	470.8	424.4
6	7.46	1342.32	1318.2	122.7	125.7	137.9	150.4	263.1	469.1	425.7

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	1288.6	465.8	0.0194	7.88	5 0.89598	6 0.99764	11 0.97013	16 1.00595	23 0.91615	29 1.04028	34 1.95272	35 1.13675		
2	1317.6	414.4	0.0191	7.82	4 0.78794	7 0.97748	12 0.96027	17 1.00645	24 1.00335	30 1.01269	41 0.91459	36 1.01321		
3	1325.5	418.8	0.0192	7.82	3 0.96961	8 1.00024	13 0.94210	18 1.01685	25 0.92809	31 0.99505	42 1.30077	37 1.02775		
4	1325.5	421.8	0.0193	7.85	2 1.30545	9 0.98578	14 1.01633	19 1.01633	26 0.99461	32 1.00127	39 0.90421	38 0.95508		
5	1358.6	424.4	0.0188	7.86	1 1.36462	10 0.97999	15 1.00958	20 0.99920	27 1.01996	33 0.99245	40 1.11184	43 0.92134		
6	1349.7	425.7	0.0190	7.85				21 0.98622	28 1.03398					

WIND TUNNEL TEST CONDITIONS..... Q 7.470 PT 17.99R PS 7.452 R/L 5.5 MACH 1.197 TEMP 101.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1327.6 TC= 418.5 PTC/PSA= 178.15 PSH(22)/PSA= 0.9439
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 500.

05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST, NON-QUIESCENT PHASE

TEST 575 RUN 451/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.47	1629.68	1592.3	85.8	85.8	95.4	150.0	200.3	448.7	412.3
2	7.48	1559.16	1533.4	88.9	87.1	98.0	152.6	215.0	453.4	414.4
3	7.47	1500.21	1476.0	91.0	88.4	101.0	152.6	228.5	455.2	414.0
4	7.46	1452.84	1418.1	92.3	89.7	104.0	151.7	239.3	455.6	411.8
5	7.47	1433.89	1409.7	94.1	90.2	105.8	151.3	247.5	453.4	411.0
6	7.46	1367.58	1341.8	93.6	90.2	107.5	150.4	253.2	448.2	408.8

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA				
1	1633.4	412.3	0.0175	7.26	5	0.89780	6	0.99806	11	0.97268	16	1.00686	23	0.91105	29	1.84053	34	1.93034	35	1.13272
2	1561.8	415.3	0.0179	7.23	4	0.88124	7	0.97372	12	0.96877	17	1.06746	24	1.00117	30	1.81308	41	0.97216	36	1.01722
3	1501.3	415.3	0.0183	7.18	3	0.97113	8	1.00220	13	0.93901	18	1.01515	25	0.92555	31	0.99547	42	1.36778	37	1.02706
4	1463.9	412.3	0.0184	7.14	2	1.38416	9	0.98563	14	1.01619	19	1.01463	26	0.99081	32	0.99961	39	0.93021	38	0.96129
5	1427.6	411.0	0.0185	7.11	1	1.36268	10	0.97631	15	1.00842	20	0.99702	27	1.01929	33	0.99881	40	1.14360	43	0.93539
6	1366.0	408.8	0.0190	7.07									21	0.98407	28	1.03172				

WIND TUNNEL TEST CONDITIONS..... 0 7.466 PT 17.998 PS 7.468 R/L 5.4 MACH 1.195 TEMP 101.3
 MODEL ATTITUDE..... ALPHA 0.06 BETA 0.06 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1492.3 TC= 412.5 PTC/PSA= 199.82 PSM(22)/PSA= 0.9595
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 580.

ORIGINAL PAGE IS
OF POOR QUALITY

A-253

86 SEPTEMBER 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 451/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.51	1681.26	1649.7	130.9	137.4	138.7	151.3	214.6	462.6	391.0
2	7.50	1689.16	1654.9	128.3	135.7	137.9	152.6	225.4	450.4	394.1
3	7.50	1689.68	1658.6	127.9	133.5	136.1	150.9	235.0	443.5	396.7
4	7.50	1644.95	1608.6	127.5	131.8	135.7	150.9	244.1	438.3	394.5
5	7.50	1576.53	1548.6	126.6	130.1	134.4	147.8	250.6	434.4	392.8
6	7.49	1524.95	1492.3	125.3	128.3	134.4	148.3	255.8	430.0	390.6

FR	PTC	IC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1683.4	391.5	0.0174	8.08	5	0.89517	6	0.99165	11	0.99784	16	1.07265	23	1.05047	29	1.14489	34	1.92521	35	1.13612
2	1692.8	394.5	0.0173	8.09	4	0.79765	7	1.05150	12	0.98082	17	1.12786	24	1.04221	30	1.09071	41	1.08813	36	1.12734
3	1688.1	396.7	0.0174	8.10	3	0.95811	8	1.11651	13	1.00971	18	1.10464	25	0.97359	31	1.09587	42	1.36674	37	1.08710
4	1661.8	395.4	0.0174	8.06	2	1.29967	9	1.07627	14	1.03654	19	1.10877	26	1.04582	32	1.09639	39	1.06182	38	1.09020
5	1573.9	393.6	0.0179	7.98	1	1.38996	10	1.02673	15	1.09226	20	1.10877	27	1.08400	33	1.08504	40	1.27233	43	1.06285
6	1525.5	391.5	0.0180	7.93								21	1.09071	28	1.08297					

WIND TUNNEL TEST CONDITIONS..... Q 7.461 PT 10.004 PS 7.497 R/L 5.5 MACH 1.193 TEMP 100.1
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1637.6 TC= 393.8 PTC/PSA= 218.43 PSH(22)/PSA= 1.0724
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 450.

TEST 575 RUN 452/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FARRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.61	1685.47	1646.0	120.5	124.9	124.9	148.7	194.7	467.8	384.1
2	10.61	1690.21	1664.4	119.7	123.1	124.9	151.7	209.4	451.7	388.0
3	10.60	1689.16	1646.0	118.8	122.3	124.9	152.6	220.7	443.0	391.0
4	10.60	1647.05	1616.5	118.4	121.0	124.9	151.7	230.6	436.5	390.2
5	10.59	1586.53	1556.0	117.5	120.1	124.9	150.9	238.9	431.8	388.4
6	10.59	1537.05	1505.5	117.5	120.1	125.3	148.3	245.8	427.9	387.6

FR	PTC	IC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1689.2	384.1	0.0173	10.57	5	0.99486	6	0.97873	11	0.95464	16	0.98566	23	0.95683	29	1.36153	34	1.36263	35	1.03967	
2	1686.0	388.4	0.0174	10.58	4	0.95289	7	0.96885	12	0.96413	17	1.03891	24	0.96559	30	1.01238	41	1.00172	36	1.03967	
3	1699.7	390.6	0.0173	10.58	3	0.88421	8	0.98639	13	0.97179	18	1.00756	25	0.94090	31	1.01848	42	0.97946	37	1.02799	
4	1648.1	390.6	0.0176	10.54	2	1.08930	9	0.97873	14	0.97581	19	1.00719	26	0.96632	32	1.00756	39	0.98311	38	1.01480	
5	1589.2	386.9	0.0179	10.47	1	1.15243	10	0.96121	15	0.98712	20	1.00318	27	0.99333	33	1.00537	40	1.09222	43	0.98931	
6	1540.2	387.6	0.0180	10.43								21	0.99697	28	0.99697						

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WIND TUNNEL TEST CONDITIONS..... Q 6.064 PT 18.089 PS 10.599 R/L 5.1 MACH 0.904 TEMP 100.2
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1642.1 TC= 388.4 PTC/PSA= 154.92 PSM[22]/PSA= 0.9934
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 445.

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06 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 453/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE			TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)				
1	10.89	1299.16	1272.8	86.7	86.7	89.7	140.3	136.6	457.8	345.5	
2	10.90	1296.93	1272.8	87.1	87.1	91.9	152.2	153.9	437.4	350.3	
3	10.89	1330.74	1303.9	87.1	88.0	93.6	152.2	168.6	424.4	355.0	
4	10.91	1318.63	1291.8	88.4	89.7	95.4	153.0	188.8	415.7	356.8	
5	10.89	1319.16	1293.9	90.6	91.0	98.4	152.2	192.0	410.5	359.4	
6	10.92	1339.68	1313.4	91.0	92.3	99.7	152.6	201.2	406.6	361.5	

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1300.2	340.4	0.0192	10.18	5 0.96777	6 0.95322	11 0.93052	16 0.95500	23 0.93265	29 1.22497	34 1.30904	35 1.01885			
2	1293.6	350.7	0.0194	10.19	4 0.92626	7 0.93549	12 0.93868	17 0.99899	24 0.94258	30 0.97735	41 0.92733	36 1.00892			
3	1330.7	355.0	0.0190	10.20	3 0.86063	8 0.96174	13 0.94480	18 0.97309	25 0.92449	31 0.97380	42 0.93513	37 0.99402			
4	1321.8	357.6	0.0192	10.22	2 1.06091	9 0.95571	14 0.94861	19 0.97238	26 0.94010	32 0.97380	39 0.91704	38 0.96138			
5	1317.6	354.8	0.0193	10.22	1 1.11819	10 0.94010	15 0.96103	20 0.96812	27 0.96812	33 0.96387	40 0.99899	43 0.93513			
6	1338.6	362.0	0.0190	10.23											

WIND TUNNEL TEST CONDITIONS..... 0 5.881 PT 10.009 PS 10.903 R/L 5.1 MACH 0.876 TEMP 97.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1317.9 TC= 355.4 PTC/PSA= 120.87 PSM(22)/PSA= 0.9362
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1608. HEATER TOTAL TEMPERATURE= 420.

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A-257

06 SEPTEMBER 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 454/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.68	813.89	801.8	126.2	134.4	136.6	148.7	181.2	363.3
2	10.71	825.47	812.8	125.7	133.1	135.3	150.4	192.5	369.4
3	10.71	846.53	829.7	125.7	131.8	134.4	152.6	201.2	373.7
4	10.71	835.47	816.0	122.3	128.3	133.1	152.2	209.4	375.9
5	10.72	849.68	838.1	122.3	127.9	132.7	148.3	216.8	379.3
6	10.71	860.74	845.5	121.8	126.6	132.2	150.4	224.1	381.5

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA
1	812.8	363.3	0.8243	9.62	5	0.99963	6	0.98198	11	0.95878	16	0.97648	23	0.95950	29	1.01225	34	1.35978	35	1.04548
2	823.9	369.8	0.8241	9.66	4	0.95589	7	0.96745	12	0.96781	17	1.02028	24	0.97179	30	0.99635	41	0.87714	36	1.03284
3	844.9	374.6	0.8236	9.68	3	0.89448	8	0.99238	13	0.97432	18	0.99346	25	0.95661	31	0.99093	42	0.86883	37	1.01369
4	839.7	376.3	0.8238	9.69	2	1.08992	9	0.98479	14	0.97432	19	0.98804	26	0.96492	32	0.97685	39	0.86068	38	0.93386
5	839.7	379.8	0.8239	9.69	1	1.14917	10	0.97878	15	0.98668	20	0.97865	27	0.99274	33	0.96203	40	0.39998	43	0.88906
6	858.6	381.9	0.8235	9.78																

WIND TUNNEL TEST CONDITIONS..... Q 5.998 PT 10.087 PS 10.787 R/L 5.1 MACH 0.895 TEMP 103.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.88 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 836.6 TC= 374.3 PTC/PSA= 78.14 PSN1221/PSA= 0.9835
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 460.

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06 SEPTEMBER 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 455/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TC
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.65	476.00	464.9	116.2	120.1	122.7	140.3	165.6	315.4	344.4
2	10.65	483.89	472.8	114.9	118.4	122.3	151.3	173.0	300.7	350.7
3	10.65	487.58	478.1	115.3	117.9	122.3	148.7	180.3	429.9	355.1
4	10.64	489.68	482.3	115.8	117.9	122.3	151.3	187.3	480.3	357.6
5	10.66	493.37	486.5	114.5	116.6	122.3	150.9	192.9	471.7	360.2
6	10.66	497.05	488.1	114.5	116.2	122.7	151.3	197.7	463.9	361.5

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	477.1	346.8	0.0330	9.21	5 0.99968	6 0.98407	11 0.95901	16 0.97572	23 0.96119	29 1.01058	34 1.36463	35 1.04616			
2	483.9	350.7	0.0327	9.20	4 0.95575	7 0.96591	12 0.96446	17 1.01748	24 0.96918	30 0.99206	41 0.79016	36 1.03055			
3	488.1	355.5	0.0325	9.21	3 0.89147	8 0.99206	13 0.97209	18 0.98915	25 0.95320	31 0.98510	42 0.80932	37 1.01021			
4	489.7	350.1	0.0325	9.20	2 1.08901	9 0.98225	14 0.97172	19 0.98153	26 0.96228	32 0.96737	39 0.76983	38 0.89583			
5	492.3	360.7	0.0324	9.23	1 1.15183	10 0.96991	15 0.96443	20 0.97063	27 0.99097	33 0.94739	40 0.79234	43 0.61231			
6	497.1	362.0	0.0322	9.23				21 0.94667	28 0.99170						

WIND TUNNEL TEST CONDITIONS..... U 6.027 PT 18.000 PS 10.652 R/L 5.1 MACH 0.899 TEMP 103.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 488.0 TC= 355.6 PTC/PSA= 45.81 PSM(22)/PSA= 0.8648
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 450.

A-259

06 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 455/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.58	446.53	440.2	117.5	123.1	125.3	146.7	171.2	530.2	350.7
2	10.59	444.43	43.1	116.6	122.3	125.3	152.6	178.6	515.0	354.6
3	10.59	449.16	442.3	116.6	120.1	124.0	147.8	185.1	500.7	359.4
4	10.58	452.85	445.5	115.3	116.8	123.6	150.8	191.2	490.5	361.1
5	10.59	456.53	448.6	114.0	117.9	123.1	151.5	196.0	478.6	362.4
6	10.59	457.26	449.2	113.6	117.1	123.1	152.6	200.3	469.9	363.7

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	446.0	351.1	0.8346	9.06	5	0.99425	6	0.97027	11	0.94764	16	0.96721	23	0.95625	29	1.02567	34	1.36330	35	1.03627									
2	446.0	355.5	0.8346	9.08	4	0.95296	7	0.96218	12	0.95552	17	1.00960	24	0.96173	30	0.95402	41	0.77720	36	1.02421									
3	449.2	359.4	0.8345	9.08	3	0.88061	8	0.98621	13	0.96283	18	0.98183	25	0.94127	31	0.97744	42	0.93725	37	1.00302									
4	453.4	362.4	0.8342	9.07	2	1.08706	9	0.97635	14	0.96356	19	0.97452	26	0.95406	32	0.95917	39	0.75309	38	0.88902									
5	457.6	362.8	0.8340	9.07	1	1.15101	10	0.95954	15	0.97525	20	0.96283	27	0.98183	33	0.93834	40	0.77428	43	0.79365									
6	456.5	364.1	0.8341	9.07									21	0.93798	28	0.98219													

WIND TUNNEL TEST CONDITIONS..... Q 6.069 PT 18.004 PS 10.586 R/L 5.2 MACH 0.905 TEMP 99.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 451.4 TC= 359.2 PTC/PSA= 42.65 PSM(22)/PSA= 0.8570
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 606, HEATER TOTAL TEMPERATURE= 710.

A-260

06 SEPTEMBER 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 457/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.73	906.53	890.2	153.9	169.5	173.4	152.2	276.1	741.7	534.1
2	10.73	924.55	906.5	153.8	166.0	179.4	151.7	290.0	715.7	540.1
3	10.71	937.06	918.1	150.4	163.0	167.3	152.2	300.9	694.0	541.9
4	10.72	943.90	923.4	145.7	158.7	164.7	152.2	311.3	675.0	542.3
5	10.71	941.27	920.7	143.9	156.1	162.6	150.9	319.9	659.4	543.2
6	10.71	946.53	928.6	143.9	153.9	161.3	147.8	328.2	647.2	541.9

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	901.8	535.4	0.0229	9.79	5	0.99675	6	0.98232	11	0.96247	16	0.97979	23	0.96030	29	1.04330	34	1.06304	35	1.03789
2	924.4	541.0	0.0225	9.81	4	0.95381	7	0.96644	12	0.96752	17	1.01732	24	0.97005	30	0.99422	41	0.89679	36	1.02995
3	930.1	543.2	0.0223	9.82	3	0.89318	8	0.99825	13	0.97438	18	0.99206	25	0.95705	31	0.98845	42	0.82180	37	1.01443
4	941.8	543.2	0.0223	9.82	2	1.00769	9	0.98232	14	0.97582	19	0.98809	26	0.96066	32	0.97654	39	0.88127	38	0.94514
5	943.9	543.6	0.0223	9.80	1	1.14032	10	0.96824	15	0.98412	20	0.97798	27	0.98989	33	0.96211	40	0.92818	43	0.90725
6	947.6	542.8	0.0223	9.82								21	0.96175	28	0.99170					

WIND TUNNEL TEST CONDITIONS..... Q 5.984 PT 17.996 PS 10.718 R/L 5.1 MACH 0.893 TEMP 100.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.8
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 933.1 TC= 541.5 PTC/PSA= 07.06 PSM(22)/PSA= 0.9151
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 625.

A-261

06 SEPTEMBER 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-LUMINESCENT PHASE

TEST 575 RUN 459/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--				MOUFL-STING FEEDER-PIPE				TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MOUFL-STING FEEDER-PIPE	MOUFL-STING FEEDER-PIPE	MOUFL-STING FEEDER-PIPE	
1	10.65	1686.01	1657.1	122.7	126.2	119.2	152.6	286.6	674.1	555.6	
2	10.65	1707.06	1688.6	122.3	125.3	120.5	151.7	304.8	653.7	554.5	
3	10.65	1689.69	1655.0	122.7	124.4	121.4	148.7	319.5	640.3	554.0	
4	10.65	1626.01	1605.5	122.3	124.4	124.0	151.3	331.2	629.0	551.0	
5	10.63	1581.27	1551.3	123.1	124.4	125.3	152.6	342.0	620.8	548.0	
6	10.60	1510.74	1484.4	124.0	124.0	127.5	151.3	349.4	611.7	540.1	

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1682.3	550.6	0.0174	10.63	5	0.99831	6	0.98305	11	0.96269	16	0.98995	23	0.96196	29	1.05757	34	1.36696	35	1.02485
2	1703.9	554.9	0.0173	10.63	4	0.95469	7	0.96741	12	0.96959	17	1.03067	24	0.97141	30	1.01213	41	1.08340	36	1.03794
3	1694.4	554.9	0.0173	10.63	3	0.89288	8	0.99359	13	0.97832	18	1.01068	25	0.95832	31	1.01177	42	0.77618	37	1.03394
4	1617.1	551.4	0.0178	10.57	2	1.09211	9	0.98377	14	0.97977	19	1.00886	26	0.96559	32	1.01140	39	0.96159	38	1.01504
5	1579.2	548.4	0.0178	10.51	1	1.15391	10	0.96959	15	0.99213	20	1.00595	27	0.99795	33	1.00522	40	1.09247	43	0.99032
6	1511.8	541.0	0.0182	10.42							21	0.99541	28	0.99686						

WIND TUNNEL TEST CONDITIONS..... Q 6.036 PT 18.002 PS 10.639 R/L 5.1 MACH 0.900 TEMP 101.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1631.4 TC= 550.2 PTC/PSA= 153.34 PSM(22)/PSA= 0.9928
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 635.

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06 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 460/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	1650.74	1622.3	123.1	127.0	130.5	148.7	275.9	714.9	537.1
2	7.38	1666.53	1637.1	122.3	125.7	130.5	150.9	251.9	681.5	543.6
3	7.38	1659.17	1631.3	122.3	123.6	130.1	147.8	272.2	657.6	545.7
4	7.38	1654.95	1617.1	121.4	123.6	130.5	150.9	290.9	642.5	545.8
5	7.38	1595.48	1562.3	121.8	121.8	130.9	148.3	305.2	629.0	544.1
6	7.38	1560.22	1533.9	121.4	120.5	131.8	151.7	317.6	619.0	538.4

FR	PTC	TC	P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1647.1	538.4	0.0176	7.23	5 0.08120	6 0.99758	11 0.97288	16 1.00327	23 0.93045	29 1.17930	34 1.96096	35 1.10543			
2	1667.1	544.1	0.0175	7.25	4 0.76594	7 0.98126	12 0.97236	17 1.04989	24 0.99803	30 1.02422	41 0.99698	36 1.01532			
3	1663.9	546.7	0.0176	7.24	3 0.94407	8 0.98126	13 0.94511	18 1.02265	25 0.92992	31 1.01689	42 1.08866	37 1.02580			
4	1661.8	546.2	0.0175	7.24	2 1.38713	9 0.98887	14 1.00170	19 1.01427	26 0.97917	32 0.99960	39 0.97760	38 0.97602			
5	1608.7	544.9	0.0178	7.20	1 1.37052	10 0.97236	15 1.00589	20 1.00536	27 1.02003	33 0.98912	40 1.24636	43 0.97917			
6	1560.7	538.4	0.0178	7.14				21 0.98703	28 1.01794						

WIND TUNNEL TEST CONDITIONS..... Q 7.494 PT 18.007 PS 7.383 R/L 5.5 MACH 1.204 TEMP 101.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1633.6 TC= 543.1 PTC/PSA= 221.26 PSM(22)/PSA= 0.9778
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2060. HEATER TOTAL TEMPERATURE= 635.

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06 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 46270

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.30	863.38	844.4	108.4	111.4	114.9	148.3	186.4	812.8	501.1
2	7.31	871.80	855.0	107.1	110.1	115.3	148.7	207.7	769.9	511.1
3	7.30	888.11	868.6	107.5	109.7	115.8	150.4	226.7	735.7	516.7
4	7.31	889.69	876.0	107.1	109.7	116.2	148.3	242.8	707.5	520.6
5	7.31	903.38	889.7	107.5	109.3	117.9	152.6	257.1	683.6	521.9
6	7.30	908.64	888.1	108.4	109.3	118.8	147.8	270.1	665.0	522.8

FR	PTC	IC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	865.0	501.6	0.0234	6.79	5	0.88753	6	0.98708	11	0.96696	16	0.98602	23	0.95107	29	1.15971	34	1.97363	35	1.11788
2	871.8	511.5	0.0234	6.79	4	0.77155	7	0.96908	12	0.98496	17	1.05380	24	0.99185	30	1.03527	41	0.80756	36	1.01727
3	889.7	517.2	0.0230	6.79	3	0.95001	8	0.97278	13	0.95478	18	1.03156	25	0.93466	31	1.02660	42	1.09352	37	1.01356
4	885.5	521.1	0.0233	6.78	2	1.38746	9	0.99502	14	0.98928	19	1.02097	26	0.96961	32	1.00932	39	0.79909	38	0.93413
5	902.3	523.2	0.0230	6.80	1	1.36518	10	0.98443	15	1.00085	20	1.00826	27	1.03209	33	0.97755	40	0.91824	43	0.81710
6	909.7	523.7	0.0229	6.80							21	0.98761	28	1.01780						

WIND TUNNEL TEST CONDITIONS..... Q 7.514 PT 18.004 PS 7.304 R/L 5.5 MACH 1.212 TEMP 101.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 887.3 TC= 516.4 PTC/PSA= 121.48 PSM(22)/PSA= 0.9296
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 615.

A-264

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-GLUISCENT PHASE

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A-265

FRAME	MSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEETER-PIPE	TOP	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.09	1703.38	1663.9	92.8	93.0	91.2	150.9	272.5	687.1	525.8
2	5.15	1710.74	1672.3	92.8	93.2	94.9	148.3	229.8	655.9	531.0
3	5.16	1684.43	1652.8	93.2	92.8	96.2	152.2	252.3	634.7	528.9
4	5.16	1640.22	1607.6	94.5	94.5	98.8	150.4	272.2	620.3	528.9
5	5.17	1564.43	1543.4	94.5	94.5	100.6	152.6	286.6	618.2	525.0
6	5.18	1512.85	1480.2	98.0	94.5	102.3	152.2	300.0	597.4	518.5

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WIND TUNNEL TEST CONDITIONS..... Q 7.745 PT 18.002 PS 5.152 R/L 5.3 MACH 1.466 TEMP 101.0
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1637.5 TC= 527.1 PTC/PSA= 317.83 PSNI221/PSA= 1.0320
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 620.

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06 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 467/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.15	870.74	856.0	92.8	101.9	119.7	148.7	249.7	720.5	517.2
2	5.13	894.43	879.2	94.9	101.4	119.7	150.0	264.4	694.5	521.5
3	5.16	898.64	885.5	95.4	101.4	118.8	148.7	276.6	671.9	524.1
4	5.17	911.80	893.4	95.8	101.0	119.2	151.7	287.4	654.2	524.1
5	5.13	918.64	902.8	95.8	101.0	118.8	148.3	297.0	640.3	524.1
6	5.15	923.90	908.1	98.8	100.6	118.8	148.3	304.8	628.2	524.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	870.2	517.6	0.0235	5.02	5 0.88482	6 0.89989	11 0.96969	16 0.91862	23 0.95542	29 1.09062	34 2.79866	35 0.96218		
2	891.3	521.9	0.0231	5.04	4 0.79318	7 0.93890	12 0.94840	17 0.92763	24 1.00950	30 0.98772	41 0.89308	36 1.13193		
3	897.6	524.5	0.0230	5.02	3 1.03204	8 1.00575	13 0.98068	18 0.95091	25 0.93289	31 0.98997	42 1.56458	37 1.07109		
4	913.9	525.0	0.0227	5.02	2 1.37755	9 1.00049	14 0.95317	19 0.97270	26 0.89083	32 1.02227	39 0.88707	38 1.08047		
5	917.1	525.0	0.0227	5.03	1 1.39182	10 0.98997	15 0.95918	20 0.96143	27 0.93965	33 1.00124	40 1.10865	43 0.89233		
6	919.2	524.1	0.0228	5.02				21 1.02528	28 0.94115					

WIND TUNNEL TEST CONDITIONS..... Q 7.747 PT 18.007 PS 5.150 R/L 5.3 MACH 1.466 TEMP 101.1
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 901.5 TC= 523.0 PTC/PSA= 175.07 PS4(22)/PSA= 0.9761
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 615.

07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 468/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TC4	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1655.50	1618.1	74.1	83.2	75.0	150.4	176.9	691.9	507.2
2	1.21	1691.29	1661.3	74.6	75.4	76.7	150.0	212.0	656.8	517.2
3	1.21	1691.29	1659.7	75.0	75.9	76.0	150.0	241.0	674.7	521.5
4	1.21	1677.61	1642.3	75.4	75.0	80.2	151.7	265.3	618.0	522.8
5	1.21	1628.66	1602.3	78.0	76.7	82.4	151.3	287.9	609.1	522.8
6	1.21	1559.71	1533.9	80.6	78.0	85.0	152.2	305.2	600.0	518.5

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	1663.4	507.2	0.0175	1.41	5	0.87078	6	0.88800	11	0.95557	16	0.99955	23	0.97150	29	0.91541	34	1.85693	35	0.72098
2	1687.1	517.6	0.0174	1.43	4	0.82887	7	0.90584	12	1.01549	17	0.95939	24	1.01103	30	0.96704	41	1.70523	36	0.92943
3	1689.7	522.4	0.0174	1.44	3	1.49933	8	0.94409	13	1.02250	18	1.01676	25	0.99764	31	0.99700	42	1.16647	37	1.22394
4	1679.2	522.8	0.0174	1.45	2	2.64805	9	1.02314	14	0.98170	19	1.02250	26	0.96130	32	0.96130	39	1.58730	38	1.06967
5	1628.8	525.2	0.0177	1.45	1	2.61936	10	0.99190	15	1.03461	20	1.02378	27	1.00784	33	0.96513	40	5.54599	43	1.56818
6	1561.8	519.3	0.0180	1.45									21	1.02696	28	0.99955				

WIND TUNNEL TEST CONDITIONS..... Q 10.284 PT 89.965 PS 1.214 R/L 10.6 MACH 3.480 TEMP 131.9
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1650.3 TC= 518.8 PTC/PSA= 1359.92 PSM(22)/PSA= 1.1845
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 613.

A-267

07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 46970

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TC	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1240.76	1215.0	144.8	158.7	178.8	150.9	257.1	717.3	514.1
2	1.21	1252.87	1228.7	142.6	155.6	168.2	150.0	278.3	682.8	521.9
3	1.21	1273.92	1248.1	141.8	153.9	167.3	151.3	298.3	658.1	527.6
4	1.21	1288.13	1267.1	139.2	151.3	165.6	152.2	314.7	639.0	529.3
5	1.21	1312.34	1285.0	137.9	148.7	164.3	151.3	329.0	626.0	532.3
6	1.21	1311.29	1287.6	139.2	147.8	164.3	152.2	343.3	617.7	534.1

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	1241.8	514.1	0.0196	1.36	5	0.86325	6	0.88364	11	0.96073	16	0.99959	23	0.96646	29	0.91358	34	0.80794	35	0.71672
2	1252.9	522.4	0.0196	1.37	4	0.81738	7	0.89893	12	1.00978	17	0.95308	24	1.00851	30	0.96391	41	1.49078	36	0.92823
3	1274.4	528.0	0.0195	1.38	3	1.49843	8	0.94480	13	1.01615	18	1.00851	25	0.99256	31	1.00150	42	7.07802	37	1.64241
4	1288.1	529.7	0.0194	1.38	2	2.62225	9	1.01806	14	0.98493	19	1.01360	26	0.95816	32	0.95690	39	1.44618	38	1.85629
5	1310.2	533.2	0.0192	1.39	1	2.60759	10	0.98876	15	1.02762	20	1.01488	27	1.00150	33	0.95810	40	5.03298	43	1.42325
6	1312.3	534.9	0.0192	1.40							21	1.01806	28	0.99067						

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.019 PS 1.214 R/L 10.6 MACH 3.480 TEMP 101.5
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1280.0 TC= 527.1 PTC/PSA= 1054.10 PSM(27)/PSA= 1.1361
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 626.

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07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 470/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	777.08	761.3	150.4	161.7	175.6	151.3	238.0	786.8	497.4
2	1.21	792.34	776.0	147.4	168.0	173.0	152.2	255.8	798.0	502.0
3	1.21	809.71	795.5	145.7	157.8	170.4	152.2	272.7	718.3	511.1
4	1.21	822.34	807.6	143.5	155.6	169.1	151.7	286.3	692.7	515.9
5	1.21	838.13	821.8	143.5	153.9	167.8	150.0	303.0	672.4	520.2
6	1.21	848.13	831.3	143.1	152.2	166.9	151.7	315.2	655.5	522.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	776.0	492.5	0.0247	1.24	5	0.64658	6	0.88356	11	0.96446	16	0.99121	23	0.96387	29	0.91413	34	8.65401	35	0.71920
2	791.8	502.0	0.0245	1.25	4	0.88839	7	0.89821	12	1.00905	17	0.93643	24	1.00523	38	0.96318	41	1.20080	36	0.92942
3	808.1	510.7	0.0243	1.25	3	1.48873	8	0.94726	13	1.01669	18	0.99822	25	0.99121	31	0.99950	42	5.99442	37	1.63843
4	822.3	515.9	0.0240	1.26	2	2.59971	9	1.01733	14	0.98357	19	1.00204	26	0.95554	32	0.95554	39	1.19761	38	1.03644
5	837.1	520.2	0.0238	1.26	1	2.60289	10	0.98994	15	1.02689	28	1.00523	27	1.00013	33	0.95809	40	3.31891	43	1.17786
6	848.1	523.2	0.0236	1.27							21	1.80841	28	0.98994						

WIND TUNNEL TEST CONDITIONS..... 0 10.291 PT 90.027 PS 1.214 R/L 10.6 MACH 3.480 TEMP 101.5
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 813.9 TC= 510.7 PTC/PSA= 670.23 PSH(22)/PSA= 1.0324
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 620.

A-269

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OF POOR QUALITY

07 SEPTEMBER 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIFSCENT PHASE

TEST 575 RUN 471/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	366.03	360.8	151.3	163.4	177.3	152.2	209.4	860.5	440.9
2	1.21	374.97	369.7	147.6	160.8	174.3	152.6	219.8	830.6	455.7
3	1.21	384.45	379.2	146.5	158.7	171.7	152.6	231.5	892.4	466.0
4	1.21	391.29	385.5	144.8	156.1	169.1	150.4	242.8	776.8	474.3
5	1.21	396.55	390.8	143.9	153.9	166.9	148.7	253.2	755.2	481.6
6	1.21	401.82	397.1	142.6	152.6	165.6	150.9	263.1	735.7	486.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	365.0	440.4	0.0396	1.21	5	0.85238	6	0.88423	11	0.96514	16	0.99954	23	0.96387	29	0.91481	34	0.31996	35	0.73134
2	373.9	454.8	0.0390	1.22	4	0.88460	7	0.89952	12	1.01037	17	0.93584	24	1.00336	30	0.96450	41	0.89825	36	0.93647
3	383.9	466.5	0.0382	1.22	3	1.47479	8	0.94603	13	1.01483	18	1.00527	25	0.98744	31	0.99572	42	5.88959	37	1.85638
4	390.2	473.8	0.0378	1.22	2	2.56390	9	1.01610	14	0.98425	19	1.01037	26	0.95431	32	0.95558	39	0.88232	38	1.03203
5	395.5	481.6	0.0375	1.22	1	2.59473	10	0.98999	15	1.02638	20	1.01419	27	0.99890	33	0.95758	40	1.61812	43	0.85684
6	401.3	480.0	0.0371	1.22									21	1.01802	28	0.98680				

WIND TUNNEL TEST CONDITIONS..... Q 10.298 PT 90.023 PS 1.214 R/L 10.6 MACH 3.480 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 385.0 TC= 467.2 PTC/PSA= 317.02 PSH(22)/PSA= 1.0008
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 610.

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05 SEPTEMBER 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 472/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODFL-STING FEEDER-PIPE	TC	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.61	10.21	11.3	88.9	87.1	85.8	150.0	85.8	73.3	82.4
2	10.62	10.21	11.3	90.2	88.0	87.1	152.6	85.8	73.3	82.8
3	10.60	9.68	11.3	91.5	88.9	88.4	151.7	86.7	74.1	82.8
4	10.62	10.74	11.3	91.5	89.3	88.4	150.0	87.1	74.1	84.1
5	10.60	9.68	11.3	91.9	89.7	89.7	151.3	87.6	75.0	83.7
6	10.62	10.21	11.3	91.5	89.7	89.7	147.8	87.1	74.1	84.5

FR	PTC	Tc P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	10.7	84.1 1.2090	9.96	5 0.99835	6 0.98377	11 0.95607	16 0.97757	23 0.96008	29 1.01840	34 1.35957	35 1.04974		
2	11.8	85.0 1.1011	9.98	4 0.95753	7 0.96773	12 0.96591	17 1.02367	24 0.97065	30 0.99835	41 0.91051	36 1.03662		
3	10.2	85.4 1.2714	9.98	3 0.88645	8 0.99143	13 0.97065	18 0.99580	25 0.94987	31 0.99325	42 0.97539	37 1.01021		
4	10.7	85.8 1.2100	9.98	2 1.08911	9 0.98414	14 0.97393	19 0.99288	26 0.96518	32 0.98195	39 0.91525	38 0.95170		
5	10.7	85.8 1.2090	9.98	1 1.14925	10 0.96737	15 0.98450	20 0.98486	27 0.99143	33 0.96992	40 0.98686	43 0.90548		
6	10.2	85.8 1.2714	9.98				21 0.97247	28 0.99361					

WIND TUNNEL IFST CONDITIONS..... 0 6.049 PT 17.998 PS 10.612 R/L 5.1 MACH 0.903 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.80 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 10.7 TC= 85.3 PTC/PSA= 1.01 PSM(22)/PSA= 0.9402
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

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05 SEPTEMBER 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUISCENT PHASE

TEST 575 RUN 473/0

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----							TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MOOFL-STING FEEDER-PIPE		
1	7.47	7.05	7.6	92.3	90.6	90.2	152.6	90.2	78.1	89.7
2	7.42	6.53	7.6	91.5	90.2	89.7	152.6	89.7	77.6	89.7
3	7.43	6.53	7.6	89.7	89.3	89.7	152.6	89.7	77.6	89.7
4	7.41	6.53	7.6	91.0	90.6	89.7	151.3	90.2	78.9	90.2
5	7.43	6.53	7.6	89.7	89.7	89.7	150.4	89.7	77.2	89.7
6	7.45	6.53	7.6	89.7	89.3	89.7	150.9	89.7	77.6	90.2

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	7.1	91.5	1.6904	6.84	5	0.90166	6	1.00207	11	0.97242	16	1.00675	23	0.91466	29	1.05046	34	1.93903	35	1.15972
2	7.1	91.9	1.6876	6.82	4	0.78667	7	0.97833	12	0.96149	17	1.05306	24	1.03467	30	1.01248	41	0.75494	36	1.00259
3	6.5	91.0	1.8252	6.83	3	0.95733	8	1.00851	13	0.94016	18	1.01716	25	0.92039	31	0.98958	42	1.35535	37	1.03017
4	7.1	92.3	1.6876	6.81	2	1.38020	9	0.99863	14	1.00259	19	1.01456	26	0.99115	32	0.99843	39	0.74713	38	0.93704
5	7.1	91.9	1.6890	6.82	1	1.39066	10	0.97814	15	1.00623	20	1.00259	27	1.01872	33	0.98958	40	0.77263	43	0.80696
6	7.1	91.9	1.6904	6.82									21	0.98334	28	1.03069				

WIND TUNNEL TEST CONDITIONS..... Q 7.479 PT 18.084 PS 7.434 R/L 5.4 MACH 1.199 TEMP 101.6
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 7.0 TCM 91.8 PTC/PSA= 0.94 PSM(22)/PSA= 0.9178
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

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05 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 474/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.18	4.42	5.5	107.5	113.6	117.5	152.2	122.3	243.2	133.1
2	5.12	4.42	4.9	107.5	112.3	116.2	152.6	121.0	243.2	132.7
3	5.15	4.42	4.9	107.5	111.0	114.0	150.4	121.4	244.5	129.6
4	5.12	4.42	4.9	107.5	111.9	111.9	148.7	120.1	244.5	129.2
5	5.15	4.42	5.5	104.9	109.7	110.1	150.0	118.4	244.1	128.8
6	5.16	4.42	4.9	105.8	107.5	110.1	148.3	116.8	244.9	128.3

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	3.9	134.4	2.8893	4.98	5	0.87602	6	0.90006	11	0.97444	16	0.91734	23	0.95565	29	0.90832	34	2.83090	35	0.96767
2	4.4	134.4	2.5498	4.98	4	0.78811	7	0.93462	12	0.93387	17	0.90457	24	1.00223	30	0.98495	41	0.71223	36	1.14047
3	4.9	131.4	2.2744	4.98	3	1.02027	8	0.99096	13	0.94589	18	0.93837	25	0.91734	31	1.03454	42	2.28621	37	1.05783
4	4.4	130.9	2.5453	4.98	2	1.39609	9	0.98345	14	0.95716	19	0.97293	26	0.88578	32	1.01200	39	0.70772	38	1.07361
5	4.4	130.1	2.5453	4.97	1	1.38389	10	0.97594	15	0.95941	20	0.95866	27	0.93537	33	0.99923	40	0.71674	43	0.77234
6	4.4	130.1	2.5498	4.99							21	1.01876	28	0.94138						

WIND TUNNEL TEST CONDITIONS..... Q 7.747 PT 18.007 PS 5.148 R/L 5.3 MACH 1.466 TFMP 103.8
 MODEL ATTITUDE..... ALPHA 8.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 4.4 TC= 131.9 PTC/PSA= 0.86 PSM(22)/PSA= 0.9678
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

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07 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 475/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING	FFEDP-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	-0.29	2.3	101.0	106.7	112.3	150.9	117.1	637.7	126.2
2	1.21	-0.29	2.3	98.4	104.9	110.1	150.0	114.9	636.0	125.7
3	1.21	-0.29	2.3	97.5	103.6	108.8	150.4	114.9	636.0	125.7
4	1.21	-0.29	1.8	98.0	102.7	107.5	147.4	114.5	636.0	126.6
5	1.21	-0.29	2.3	95.8	101.4	106.7	148.3	114.0	636.4	126.2
6	1.21	-0.29	2.3	95.8	100.6	104.9	148.3	113.6	636.8	126.2

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	-0.3	127.535.4195	1.21	5 0.84748	6 0.88444	11 0.95772	16 0.99340	23 0.95963	29 0.91375	34 3.82259	35 0.73151				
2	-0.3	127.535.4540	1.21	4 0.79714	7 0.90101	12 1.00933	17 0.91056	24 0.99595	30 0.96473	41 0.45178	36 0.93669				
3	0.2	127.843.4640	1.21	3 1.46557	8 0.94752	13 1.01315	18 1.00105	25 0.96512	31 0.98193	42 3.82259	37 1.49870				
4	0.2	127.943.4637	1.22	2 2.55328	9 1.01953	14 0.97747	19 1.00551	26 0.95453	32 0.96027	39 0.43585	38 0.99914				
5	-0.3	127.035.4195	1.22	1 2.56347	10 0.99340	15 1.02654	20 1.01443	27 0.99914	33 0.96027	40 0.32752	43 0.33389				
6	0.8	127.513.4602	1.22				21 1.02271	28 0.98830							

WIND TUNNEL TEST CONDITIONS..... Q 10.288 PT 90.002 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.1
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 0.1 TC= 127.4 PTC/PSA= 0.05 PSM(22)/PSA= 1.0014
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

A-274

24 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALA AMA
PLUME TECH OLOGY TEST NOZZLE CALIBRATION PBASE

TEST 575 RUN 50170

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TEMPERATURE DATA---DEGREES FAHRENHEIT---

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
1	0.58	485.00	542.0	173.3	165.0	121.0	152.6	294.8	733.0
2	0.59	491.85	546.9	174.2	165.4	121.8	152.6	306.2	713.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	485.53		471.2	0.12435	0.01178	0.01095	0.01124	0.03215	0.00000
2	483.95		474.3	0.12455	0.01182	0.01099	0.01132	0.03226	0.00000
3	485.00		477.4	0.12511	0.01185	0.01103	0.01134	0.03233	0.00000
4	486.58		477.8	0.12470	0.01181	0.01099	0.01128	0.03229	0.00000
5	488.69		479.1	0.1 478	0.01180	0.01098	0.011 9	0.03 9	0.00000
6	489.74		480.4	0.12431	0.01178	0.01096	0.01127	0.03215	0.00000

TUNNEL STAT C PRESSURE= 0.585 HEATER TOTAL PRESSURE= 500. HEATER TOTAL TEMPERATURE= 620. ALPHA= 0.00

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24 AUGUST 1973

MSFC TRISONIC IND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NO LE CALIBRATION PHASE

TEST 575 RUN 50270

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODFL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.47	950.79	91.4	179.5	171.1	151.	152.2	12.4	704.8	500.7
2	0.49	966.58	945.1	179.5	171.1	152.2	152.6	329.1	681.1	509.9

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	948.69		501.6	0.12394	0.01177	0.01098	0.01135	0.03206	0.00000
2	954.48		504.6	0.12350	0.01174	0.01095	0.01133	0.03193	0.00000
3	948.16		505.5	0.12443	0.01185	0.01105	0.01143	0.03221	0.00000
4	957.64		508.2	0.12341	0.01175	0.01094	0.01133	0.03193	0.00000
5	962.90		509.0	0.12315	0.01171	0.01091	0.01131	0.03189	0.00000
6	958.69		509.9	0.12390	0.01178	0.01098	0.01138	0.03207	0.00000

TUNN L STATIC PR SSUR = 0.480

H AT R TOTAL PR SSUR = 1000.

H AT R TOTAL T MP RATUR = 630.

ALPHA = 0.00

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24 AUGUST 1973

MSFC TRANSONIC WIND TUNNEL HUNTS HILL, ALABAMA
PLUME TECHNOLOGY TEST NO LE CALIBRATION PHASE

TEST 575 RUN 503/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM
1	.37	13 8.16	1228.4	81.4	81.8	82.2	152.6	138.1	75 .2
2	0.38	1327.64	1246.5	80.9	81.8	84.9	152.2	180.4	708.4

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1317.11		487.0	0.12328	0.01165	0.01085	0.01123	0.03177	0.00000
2	1312.37		491.9	0.12396	0.01173	0.01093	0.01133	0.03201	0.00000
3	131 . 8		95.0	0.12 06	0.01173	0.01093	0.01131	0.03199	0.00000
4	1334.48		496.3	0.12273	0.01159	0.01079	0.01117	0.03163	0.00000
5	1320.27		497.2	0.12382	0.01172	0.01091	0.01132	0.03200	0.00000
6	1327.11		499.4	0.12348	0.01169	0.01089	0.01127	0.03188	0.00000

TUNNEL STATIC PRESSURE= 0.379 HEATER TOTAL PRESSURE= 1400. HEATER TOTAL TEMPERATURE= 630. ALPHA= 0.00

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24 AUGUST 1 73
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HSFC TRISOMIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 503/0

FRAME	TEMPERATURE DATA---DEGREES FAHRENHEIT---									TCH
	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE		
1	0.37	1308.16	1228.4	81.4	81.8	82.2	152.6	138.1	750.2	488.6
2	0.38	1327.64	1246.5	80.9	81.8	84.9	152.2	180.4	708.4	499.4

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1317.11		487.0	0.12328	0.01165	0.01085	0.01123	0.03177	0.00000
2	1312.37		491.9	0.12396	0.01173	0.01093	0.01133	0.03201	0.00000
3	1314.48		495.0	0.12406	0.01173	0.01093	0.01131	0.03199	0.00000
4	1334.48		496.3	0.12273	0.01159	0.01079	0.01117	0.03163	0.00000
5	320.27		497.2	0.2382	0.0 72	0.0 09	0.0 32	0.03200	0.00000
6	1327.11		499.4	0.12348	0.01169	0.01089	0.01127	0.03188	0.00000

TUNNEL STATIC PRESSURE= 0.379 HEATER TOTAL PRESSURE= 1400. HEATER TOTAL TEMPERATURE= 630. ALPHA= 0.00

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24 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NO LE CALIBRATION PHASE

TEST 575 RUN 504/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]		
1	0.38	1689.22	1549.6	164.5	185.2	177.7	147.8	239.8	511.2
2	0.40	1720.27	1568.6	164.1	184.3	178.6	150.9	273.2	520.0

FRAME	PTC	P C S	TC	P N[44]/PTC P N[45]/PTC		P N[46]/PTC P N[47]/PTC		P N[48]/PTC P N[49]/PTC	
				S	S	S	S	S	S
1	1672.90		509.9	0.12301	0.01169	0.01091	0.01130	0.03181	0.00000
2	1700.27		514.8	0.12144	0.01153	0.01076	0.01117	0.03139	0.00000
3	1701.85		516.5	0.12168	0.01155	0.01079	0.01119	0.03148	0.00000
4	1691.85		517.8	0.12257	0.01164	0.01088	0.01128	0.03171	0.00000
5	1702.37		519.6	0.12217	0.01159	0.01084	0.01124	0.03159	0.00000
6	1715.00		519.2	0.12156	0.01154	0.01077	0.01116	0.03142	0.00000

TUNNEL STATIC PRESSURE= 0.390 HEATER TOTAL PRESSURE= 1800. HEATER TOTAL TEMPERATURE= 640. ALPHA= 0.00

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24 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
LUME TECHNOLOGY TEST NOZZLE CALIBRATION BASE

TEST 575 RUN 505/0

TEMPERATURE DATA---DEGREES FAHRENHEIT---										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1	0.37	1942.90	1760.4	221.7	247.7	238.0	147.8	310.6	679.3	533.7
2	0.40	1966.58	1782.8	221.3	246.8	239.3	148.2	339.2	653.8	540.7

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1937.64		533.7	0.12215	0.01163	0.01087	0.01127	0.03166	0.00000
2	1943.95		536.3	0.12201	0.01162	0.01086	0.01127	0.03162	0.00000
3	1960.79		537.2	0.12127	0.01154	0.01078	0.01120	0.03142	0.00000
4	1966.58		538.5	0.12101	0.01153	0.01076	0.01118	0.03138	0.00000
5	1965.01		539.4	0.12136	0.01156	0.01079	0.01121	0.03146	0.00000
6	1960.79		539.4	0.12173	0.01160	0.01083	0.01124	0.03157	0.00000

TUNNEL STATIC PRESSURE= 0.586

HEATER TOTAL PRESSURE= 2100.

HEATER TOTAL TEMPERATURE= 640.

ALPHA= 0.00

24 AUGUST 1973

USFC TRANSONIC WIND TUNNEL - HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 506/2

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	SA	PTC	SKI(1)	SKI(2)	SKI(3)	SKI(4)	SKI(5)	MODEL-STING FEEDER-PIPE	TCM	
1	0.42	551.55	597.9	103.8	105.0	106.6	152.2	152.6	777.9	464.6
2	0.43	540.79	586.2	105.6	106.9	109.5	152.6	179.9	742.2	473.8

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	554.48	1888.68	464.2	0.17508	0.02157	0.02114	0.02090	0.05286	0.00000
2	549.74	1889.21	467.2	0.17513	0.02161	0.02019	0.02093	0.05295	0.00000
3	551.32	1889.73	468.1	0.17427	0.02147	0.02008	0.02078	0.05256	0.00000
4	545.00	1888.68	470.8	0.17610	0.02174	0.02033	0.02104	0.05323	0.00000
5	543.95	1888.15	472.1	0.17589	0.02173	0.02031	0.02105	0.05315	0.00000
6	546.06	11.85	473.8	0.17485	0.02161	0.02020	0.02093	0.05282	0.00000

TUNNEL STATIC PRESSURE= 0.424 HEATER TOTAL PRESSURE= 625. HEATER TOTAL TEMPERATURE= 620. ALPHA= 0.00

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24 AUGUST 1973

USFC TRISCALC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 507/0

TEMPERATURE DATA--DEGREES FAHRENHEIT--										
FRAME	PS-	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCM
1	0.43	1003.43	975.0	163.0	183.4	175.5	147.8	228.3	717.6	516.0
2	0.44	980.69	962.7	164.1	183.0	177.3	152.2	259.1	682.5	511.2

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	986.06	1886.05	506.4	0.17725	0.02195	0.02067	0.02132	0.05420	0.00000
2	987.11	1886.58	508.2	0.17625	0.02183	0.02055	0.02122	0.05391	0.00000
3	991.85	1886.58	509.0	0.17511	0.02171	0.02042	0.02109	0.05361	0.00000
4	980.27	1886.58	508.6	0.17656	0.02192	0.02060	0.02130	0.05408	0.00000
5	988.16	1885.52	511.2	0.17535	0.02174	0.02044	0.02114	0.05365	0.00000
6	986.06	13.43	511.2	0.17563	0.02179	0.02049	0.02117	0.05376	0.00000

TUNNEL STATIC PRESSURE= 0.435 HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 640. ALPHA= 0.00

27 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 50870

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	0.37	1478.74	1372.8	110.4	110.8	113.0	150.0	173.8	441.3	419.7
2	0.37	1487.16	1376.7	110.4	110.4	114.4	147.8	207.6	471.2	446.1

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1477.16		419.7	0.17312	0.02127	0.02003	0.02072	0.05291	0.00000
2	1474.52		427.6	0.17370	0.02137	0.02010	0.02080	0.05310	0.00000
3	1470.31		432.0	0.17392	0.02145	0.02016	0.02088	0.05325	0.00000
4	1468.21		435.6	0.17177	0.02116	0.01991	0.02061	0.05254	0.00000
5	1468.21		440.8	0.17224	0.02125	0.01996	0.02067	0.05272	0.00000
6	1467.16		444.4	0.17249	0.02130	0.02000	0.02073	0.05278	0.00000

TUNNEL STATIC PRESSURE= 0.371 HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 625. ALPHA= 0.02

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27 AUGUST 1973

 NSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 500/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.71	1885.05	1712.0	77.8	79.2	80.5	152.6	162.8	684.2	512.0
2	0.73	1881.37	1708.5	80.0	80.9	83.6	152.6	216.4	638.4	513.9

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1889.26		513.4	0.17151	0.02155	0.02023	0.02095	0.05317	0.00000
2	1905.05		513.4	0.16977	0.02132	0.02001	0.02073	0.05259	0.00000
3	1893.47		513.4	0.17092	0.02145	0.02013	0.02086	0.05295	0.00000
4	1899.26		514.8	0.17029	0.02138	0.02005	0.02078	0.05272	0.00000
5	1902.95		513.9	0.16975	0.02133	0.02001	0.02075	0.05261	0.00000
6	1888.74		514.3	0.17081	0.02146	0.02013	0.02088	0.05296	0.00000

TUNNEL STATIC PRESSURE= 0.720 HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 600. ALPHA= 0.00

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27 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 51170

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
1	0.40	2025.58	1828.6	174.6	193.1	188.7	151.8	230.1	188.7
2	0.41	2014.53	1816.3	176.4	193.6	189.2	151.3	225.7	146.0

FRAME	PTC	PSC	TC	PSN[44]/PTC	PSN[45]/PTC	PSN[46]/PTC	PSN[47]/PTC	PSN[48]/PTC	PSN[49]/PTC
1	2026.63		190.9	0.17173	0.02046	0.01952	0.01992	0.05320	0.00000
2	2021.37		177.3	0.17188	0.02048	0.01955	0.01994	0.05341	0.00000
3	2026.63		178.2	0.17148	0.02043	0.01949	0.01988	0.05333	0.00000
4	2017.68		162.8	0.17189	0.02048	0.01958	0.01994	0.05362	0.00000
5	2013.47		155.3	0.17195	0.02051	0.01958	0.01996	0.05368	0.00000
6	2005.05		148.7	0.17218	0.02055	0.01964	0.01999	0.05401	0.00000

TUNNEL STATIC PRESSURE= 0.409 HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 0. ALPHA= 0.04

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27 AUGUST 1973

MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 512/D

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	0.42	1569.26	1446.7	134.2	147.4	151.8	150.9	173.3	172.9	112.6
2	0.43	1572.95	1450.2	139.4	146.0	150.9	150.0	163.2	130.2	95.9

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1569.79		114.4	0.17584	0.02132	0.02037	0.02068	0.05384	0.00000
2	1571.37		110.0	0.17623	0.02173	0.02081	0.02109	0.05407	0.00000
3	1574.00		106.9	0.17606	0.02201	0.02100	0.02131	0.05404	0.00000
4	1574.80		102.9	0.17619	0.02228	0.02129	0.02158	0.05427	0.00000
5	1575.05		100.7	0.17639	0.02256	0.02153	0.02181	0.05481	0.00000
6	1573.47		97.2	0.17657	0.02279	0.02183	0.02212	0.05609	0.00000

TUNNEL STATIC PRESSURE= 0.424 HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 0. ALPHA= 0.00

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27 AUGUST 1973

MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 513/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCN	
1	0.41	1115.05	1067.8	162.8	178.2	176.0	152.6	200.2	349.3	188.7
2	0.42	1099.26	1054.6	163.6	178.2	175.5	150.4	199.7	288.6	162.8

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1104.52		190.0	0.17105	0.01970	0.01863	0.01918	0.05084	0.00000
2	1099.26		183.0	0.17387	0.01997	0.01893	0.01942	0.05166	0.00000
3	1099.79		179.0	0.17396	0.01994	0.01891	0.01941	0.05161	0.00000
4	1101.89		173.8	0.17354	0.01986	0.01884	0.01932	0.05154	0.00000
5	1101.37		168.5	0.17399	0.01986	0.01884	0.01932	0.05159	0.00000
6	1104.00		164.5	0.17366	0.01977	0.01877	0.01923	0.05144	0.00000

TUNNEL STATIC PRESSURE= 0.416 HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 0. ALPHA= 0.02

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27 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 51470

-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	0.46	597.16	636.2	133.7	139.9	143.0	147.8	159.2	232.7	145.2
2	0.48	556.10	600.6	133.7	139.4	142.5	148.2	157.9	206.8	134.6

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/TC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	571.89		145.6	0.16546		0.01720	0.01777	0.04772	0.00000
2	588.74		146.5	0.17211		0.01786	0.01835	0.04947	0.00000
3	589.79		143.4	0.16942	0.01864	0.01754	0.01803	0.04865	0.00000
4	588.84		140.8	0.17031	0.01881	0.01767	0.01821	0.04905	0.00000
5	562.42		138.6	0.17287	0.01921	0.01807	0.01861	0.05001	0.00000
6	554.92		135.5	0.17082	0.01912	0.01793	0.01849	0.04970	0.00000

TUNNEL STATIC PRESSURE= 0.473 HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 0. ALPHA= 0.04

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29 AUG 1973

 WIND TUNNEL MONTVILLE, ALABAMA
 PLUVE TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 515/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM
1	1.22	1167.16	1168.2	107.5	117.1	110.6	0.0	132.2	244.5
2	1.22	1165.05	1166.1	107.4	115.0	110.1	0.0	140.5	244.5
3	1.22	1168.74	1168.2	106.7	114.5	108.4	0.0	146.5	243.2
4	1.22	1164.00	1165.6	104.9	113.2	107.5	0.0	153.0	241.0
5	1.21	1154.00	1155.1	104.9	111.9	107.5	0.0	158.2	240.2
6	1.21	1165.58	1167.2	102.7	110.6	106.7	0.0	163.0	238.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1167.7	245.9	0.0197	1.19	5	0.84781	6	0.88855	11	0.95984	16	0.99166	23	0.96111	29	0.97193	34	3.81834
2	1161.9	246.4	0.0196	1.19	4	0.79626	7	0.90061	12	1.00821	17	0.99230	24	0.99230	30	0.97448	41	3.81834
3	1170.8	245.5	0.0197	1.19	3	1.48176	8	0.94265	13	1.00821	18	1.00375	25	0.99166	31	0.96493	42	0.75679
4	1164.5	242.4	0.0197	1.18	2	2.60645	9	1.02412	14	0.96811	19	0.99612	26	0.97893	32	0.96047	39	0.66132
5	1154.0	241.5	0.0198	1.18	1	2.76749	10	0.99166	15	1.01967	20	0.99930	27	1.00185	33	0.95156	40	0.69951
6	1166.1	240.2	0.0196	1.18								21	0.99866	28	0.99166			

WIND TUNNEL TEST CONDITIONS..... Q 10.299 PT 90.102 PS 1.215 R/L 10.7 MACH 3.480 TEMP 59.2
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1170.8 TC= 243.6 PTC/PSA= 963.33 PSM(22)/PSA= 0.9749
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1285. HEATER TOTAL TEMPERATURE= 255.

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28 AUGUST 1973

SFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
FLOW TECHNOLOGY TEST...NOV-QUIESCENT PHASE

TEST 575 RUN 51670

TEMPERATURE DATA--DEGREES FAHRENHEIT--										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	5.10	1156.10	1151.9	83.2	85.2	84.5	0.0	192.0	305.6	238.0
2	5.12	1141.37	1130.7	83.7	85.2	84.5	0.0	192.0	293.9	238.0
3	5.15	1133.47	1127.7	85.4	85.4	86.3	0.0	192.0	284.8	238.0
4	5.11	1124.52	1121.9	85.4	85.6	86.7	0.0	192.5	279.2	238.4
5	5.17	1124.52	1121.9	84.5	84.5	87.1	0.0	190.7	272.7	238.0
6	5.15	1122.95	1118.7	85.4	85.4	86.7	0.0	191.2	268.3	238.9

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1155.6	239.8	0.0197	4.97	5 0.88062	6 0.90172	11 0.98157	16 0.91076	23 0.95445	29 0.93260	34 2.78123	35 0.97931				
2	1140.8	239.8	0.0196	4.96	4 0.79475	7 0.94917	12 0.94616	17 0.94616	24 1.01321	30 0.98458	41 1.85918	36 1.14092				
3	1133.5	241.1	0.0196	4.97	3 1.02978	8 0.99437	13 0.94993	18 0.93637	25 0.92582	31 1.02601	42 0.78345	37 1.07272				
4	1122.9	240.6	0.0197	4.97	2 1.36199	9 1.00567	14 0.95671	19 0.96198	26 0.90322	32 1.01923	39 0.75331	38 1.06820				
5	1125.6	239.3	0.0196	4.96	1 1.42225	10 0.99739	15 0.95671	20 0.97177	27 0.95219	33 1.01245	40 0.78269	43 0.78396				
6	1123.5	241.1	0.0196	4.97												

WIND TUNNEL TEST CONDITIONS..... 0 7.744 PT 18.002 PS 5.135 R/L 5.3 MACH 1.468 TEMP 98.4
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1133.6 TC= 240.3 PTC/PSA= 220.78 PSM(22)/PSA= 0.9675
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 270.

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29 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NO. 1-QUIESCENT PHASE

TEST 575 RUN 317/0

TEMPERATURE DATA--DEGREES FAHRENHEIT--										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM	
1	7.32	1209.70	1200.6	93.6	94.5	96.7	0.0	135.3	281.5	229.3
2	7.28	1209.79	1214.5	95.4	94.5	97.1	0.0	139.6	274.0	230.2
3	7.30	1211.69	1208.7	94.1	94.1	97.1	0.0	144.6	268.3	231.5
4	7.29	1216.10	1210.6	92.8	93.6	97.1	0.0	148.3	263.1	231.9
5	7.28	1226.63	1223.5	92.8	94.1	98.4	0.0	150.9	260.5	232.4
6	7.29	1212.95	1211.4	94.1	94.1	99.3	0.0	154.3	258.4	233.7

FR	PTC	IC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1209.3	231.0	0.0196	6.69	5	0.89488	6	1.00044	11	0.97180	16	1.00310	23	0.94899	29	1.03970	34	1.96057	35	1.13889
2	1208.2	232.3	0.0196	6.71	4	0.76333	7	0.97870	12	0.98241	17	1.05243	24	0.99461	30	1.02803	41	1.41845	36	1.01530
3	1210.8	234.0	0.0196	6.70	3	0.94475	8	0.97976	13	0.94846	18	1.03280	25	0.93255	31	1.00151	42	0.73522	37	1.01742
4	1215.6	233.6	0.0196	6.70	2	1.30705	9	1.00151	14	0.98771	19	1.01636	26	0.99620	32	0.97657	39	0.72514	38	0.91716
5	1225.1	235.4	0.0195	6.71	1	1.36434	10	0.98506	15	1.00044	20	1.00363	27	1.03280	33	0.99037	40	0.74476	43	0.72991
6	1213.5	235.8	0.0198	6.71																

WIND TUNNEL TEST CONDITIONS..... Q 7.513 PT 17.996 PS 7.292 R/L 5.5 MACH 1.213 TEMP 98.3
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1213.7 TC= 233.7 PTC/PSA= 166.45 PSM(22)/PSA= 0.9191
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 265.

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28 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL MOUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 518/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TC
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.56	1217.16	1213.5	105.3	109.7	108.8	0.0	135.3	231.9
2	10.55	1226.63	1221.4	104.9	108.8	108.4	0.0	140.0	232.8
3	10.53	1212.95	1208.7	104.5	108.0	108.0	0.0	144.8	233.2
4	10.55	1217.68	1212.9	104.0	107.5	108.8	0.0	148.7	233.2
5	10.53	1217.16	1215.1	103.6	107.1	108.4	0.0	153.0	234.1
6	10.55	1219.26	1216.1	103.2	106.2	108.8	0.0	155.6	234.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1216.1	234.8	0.0198	9.43	5	0.99899	6	0.98248	11	0.95790	16	0.98212	23	0.96084	29	1.00009	34	1.36367	35	1.04559
2	1227.7	234.5	0.0196	9.44	4	0.95460	7	0.96781	12	0.96561	17	1.00266	24	0.96708	30	0.99092	41	1.13474	36	1.03201
3	1212.9	234.9	0.0198	9.41	3	0.87903	8	0.98762	13	0.96744	18	0.98615	25	0.95020	31	0.98065	42	0.87096	37	1.01660
4	1221.4	235.4	0.0197	9.44	2	1.09035	9	0.98359	14	0.97258	19	0.98212	26	0.97368	32	0.97331	39	0.86362	38	0.90764
5	1217.7	236.2	0.0197	9.42	1	1.15785	10	0.96487	15	0.98505	20	0.97148	27	0.99092	33	0.95057	40	0.86545	43	0.86675
6	1219.3	236.2	0.0198	9.44								21	0.95387	28	0.99459					

WIND TUNNEL TEST CONDITIONS..... Q 6.093 PT 18.002 PS 10.543 R/L 5.2 MACH 0.909 TEMP 98.2
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1219.2 TC= 235.2 PTC/PSA= 115.64 PSM(22)/PSA= 0.8946
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 260.

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28 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 519/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCW
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.61	1170.84	1165.6	103.2	107.5	105.8	0.0	263.1	311.7
2	10.60	1147.16	1142.9	103.6	106.7	106.2	0.0	261.4	312.6
3	10.61	1137.68	1132.4	104.0	107.1	107.5	0.0	258.8	311.3
4	10.59	1120.84	1117.2	103.2	106.2	108.0	0.0	257.1	311.7
5	10.59	1126.63	1124.0	101.9	105.3	108.0	0.0	255.3	311.7
6	10.59	1126.63	1123.5	103.2	105.8	109.7	0.0	253.6	312.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1170.3	314.6	0.0201	9.50	5	0.99843	6	0.98238	11	0.96085	16	0.98311	23	0.96085	29	0.99989	34	1.36555	35	1.04843
2	1146.1	315.9	0.0201	9.47	4	0.95355	7	0.96815	12	0.96669	17	1.00135	24	0.96778	30	0.99041	41	1.12798	36	1.03091
3	1139.3	315.0	0.0200	9.47	3	0.88713	8	0.98968	13	0.97033	18	0.98785	25	0.95537	31	0.98238	42	0.86962	37	1.01705
4	1120.3	314.6	0.0203	9.45	2	1.09040	9	0.98347	14	0.97179	19	0.98128	26	0.97252	32	0.97216	39	0.85721	38	0.90392
5	1126.1	314.6	0.0201	9.44	1	1.15754	10	0.96559	15	0.98530	20	0.97070	27	0.99077	33	0.94953	40	0.85976	43	0.86159
6	1125.6	315.4	0.0201	9.45									21	0.95099	28	0.99260				

WIND TUNNEL TEST CONDITIONS..... 0 6.058 PT 10.000 PS 10.599 R/L 5.2 MACH 0.904 TEMP 97.8
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1137.9 TC= 315.0 PTC/PSA= 107.36 PSM(22)/PSA= 0.8930
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 365.

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MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 520/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.36	1141.37	1139.3	113.2	119.2	119.7	0.0	197.3	353.7	303.9
2	7.38	1130.84	1130.8	113.6	118.4	119.2	0.0	200.7	349.4	305.6
3	7.38	1131.37	1129.8	113.2	117.5	119.7	0.0	204.2	347.7	306.9
4	7.39	1132.42	1130.8	112.3	115.8	119.2	0.0	206.4	344.6	309.1
5	7.39	1141.37	1138.7	111.0	114.0	119.7	0.0	209.4	342.9	309.5
6	7.38	1134.52	1131.9	110.1	114.0	119.7	0.0	211.1	342.0	310.8

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WIND TUNNEL TEST CONDITIONS,..... Q										7.492	PT	18.002	PS	7.381	R/L	5.5	MACH	1.204	TEMP	97.8	
MODEL ATTITUDE.....										ALPHA	0.04	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..										PTC=	1135.6	TC=	310.7	PTC/PSA=	153.86	PSN(221)/PSA= 0.9070					
HEATER PARAMETERS.....										HEATER TOTAL PRESSURE=				1300.	HEATER TOTAL TEMPERATURE= 370.						

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HSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 521/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODFL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	5.14	1145.05	1142.9	97.5	98.8	100.1	0.0	231.9	303.5
2	5.13	1134.80	1130.8	98.0	98.4	101.0	0.0	233.2	304.8
3	5.15	1134.52	1130.3	98.0	98.0	101.4	0.0	232.8	306.1
4	5.12	1143.47	1139.3	95.8	97.5	101.4	0.0	232.8	306.1
5	5.13	1139.26	1136.1	95.8	98.0	102.7	0.0	233.2	307.4
6	5.12	1152.42	1150.3	98.0	97.5	102.7	0.0	234.1	309.1

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1145.6	306.2	0.0200	4.97	5 0.88536	6 0.89967	11 0.98331	16 0.91022	23 0.95995	29 0.93207	34 2.80903	35 0.97804			
2	1134.5	307.5	0.0202	4.98	4 0.70590	7 0.94714	12 0.94488	17 0.93584	24 0.99989	30 0.97352	41 1.63057	36 1.15059			
3	1134.5	309.3	0.0202	4.97	3 1.02400	8 0.98633	13 0.94790	18 0.93660	25 0.92379	31 1.02852	42 0.79494	37 1.07223			
4	1144.5	309.3	0.0200	4.96	2 1.35102	9 1.00516	14 0.95242	19 0.95619	26 0.90570	32 1.02023	39 0.76857	38 1.05866			
5	1140.3	309.7	0.0202	4.99	1 1.41055	10 0.99235	15 0.96975	20 0.95769	27 0.94112	33 1.00290	40 0.79645	43 0.77761			
6	1149.8	311.0	0.0201	4.97				21 1.01195	28 0.95167						

WIND TUNNEL TEST CONDITIONS..... Q 7.742 PT 17.998 PS 5.133 R/L 5.4 MACH 1.468 TEMP 98.2
 MODEL ATTITUDE..... ALPHA 0.04 BETA 8.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1141.5 TC= 308.8 PTC/PSA= 222.38 PSM(22)/PSA= 0.9689
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1280. HEATER TOTAL TEMPERATURE= 365.

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29 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 522/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1154.52	1155.6	100.6	104.0	107.1	0.0	160.4	366.3	294.4
2	1.21	1149.79	1151.4	98.4	102.3	106.2	0.0	168.2	354.2	293.1
3	1.21	1146.63	1149.3	97.5	101.4	106.2	0.0	176.0	345.5	291.8
4	1.21	1150.84	1150.8	97.1	101.0	105.8	0.0	182.9	338.1	291.3
5	1.21	1136.10	1138.7	96.2	100.1	105.8	0.0	189.0	332.5	291.3
6	1.21	1148.74	1156.3	95.8	99.7	106.2	0.0	194.2	327.7	290.9

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1154.5	296.1	0.0201	1.18	5	0.84991	6	0.88113	11	0.95631	16	0.98880	23	0.95886	29	0.97160	34	3.82206	35	0.72567
2	1149.8	294.8	0.0201	1.18	4	0.79958	7	0.89451	12	1.00664	17	0.99326	24	0.99263	30	0.97351	41	3.82206	36	0.92700
3	1146.6	293.9	0.0201	1.18	3	1.48894	8	0.93783	13	1.00664	18	1.00282	25	0.99071	31	0.96459	42	0.75626	37	0.97988
4	1150.8	293.4	0.0200	1.18	2	2.61982	9	1.02321	14	0.96650	19	0.99454	26	0.97861	32	0.96077	39	0.67662	38	1.80091
5	1136.1	293.9	0.0202	1.18	1	2.77719	10	0.99008	15	1.02082	20	0.99709	27	1.00282	33	0.95121	40	0.71675	43	0.67789
6	1149.3	293.4	0.0201	1.18								21	0.99772	28	0.99326					

WIND TUNNEL TEST CONDITIONS..... 0 10.289 PT 90.015 PS 1.214 R/L 10.7 MACH 5.480 TEMP 99.4
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1147.9 TC= 294.2 PTC/PSA= 945.34 PSM(22)/PSA= 0.9747
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1285. HEATER TOTAL TEMPERATURE= 325.

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29 AUGUST 1973

 MSFC TRANSONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 523/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	447.16	446.1	120.1	125.3	115.8	0.0	183.4	328.6
2	1.21	439.26	438.7	120.5	124.4	118.4	0.0	189.4	335.1
3	1.21	425.05	425.1	117.9	122.7	116.6	0.0	194.7	340.3
4	1.21	428.31	419.3	117.5	121.8	116.2	0.0	200.3	342.5
5	1.21	413.47	412.4	116.6	120.5	115.3	0.0	205.1	346.4
6	1.21	413.47	412.9	113.6	118.8	114.9	0.0	210.3	349.4

FR	PTC	IC P47/PTC	PORT-22 NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO
1	447.2	330.8	0.0202	1.18	5 0.84354	6 0.88432	11 0.95950	16 0.98880	23 0.95758	29 0.96842	34 3.82286	35 0.72185			
2	437.7	337.9	0.0202	1.18	4 0.79385	7 0.89451	12 1.00537	17 0.98753	24 0.98817	30 0.97896	41 3.82286	36 0.92573			
3	424.0	343.6	0.0204	1.18	3 1.47938	8 0.94038	13 1.00601	18 1.00282	25 0.98817	31 0.96268	42 0.56640	37 0.98434			
4	418.2	345.8	0.0202	1.18	2 2.60389	9 1.02384	14 0.96714	19 0.99454	26 0.97606	32 0.95822	39 0.47656	38 1.00091			
5	413.5	349.8	0.0203	1.18	1 2.77018	10 0.99008	15 1.01938	20 0.99772	27 1.00155	33 0.95121	40 0.49568	43 0.48230			
6	412.9	352.0	0.0203	1.18				21 0.99645	28 0.99008						

WIND TUNNEL TEST CONDITIONS..... Q 10.289 PT 90.015 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 425.6 IC= 343.3 PTC/PSA= 350.49 PSH(22)/PSA= 0.9714
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 500. HEATER TOTAL TEMPERATURE= 500.

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29 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 523/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	411.85	411.9	104.9	109.3	113.6	0.0	181.6	473.4	343.3
2	1.21	412.91	412.9	104.5	107.1	112.3	0.0	188.1	466.5	347.2
3	1.22	418.17	417.6	103.6	106.2	112.3	0.0	192.9	462.6	349.8
4	1.22	419.75	418.2	103.6	106.7	112.7	0.0	198.1	460.0	352.9
5	1.21	417.12	417.1	103.2	105.3	112.3	0.0	202.5	456.5	354.2
6	1.21	421.85	421.3	102.3	104.9	113.2	0.0	207.2	454.8	356.8

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	-440.3-121.9-0.0590	1.18	5-1.27396	6 0.84956	11 0.87885	16 0.95719	23 0.98966	29 0.95910	34 0.97056	35 3.82046					
2	412.4 350.6 0.0202	1.18	4 0.79988	7 0.89095	12 1.00750	17 0.99285	24 0.99094	30 0.97247	41 3.82046	36 0.92471					
3	416.6 353.3 0.0201	1.18	3 1.48704	8 0.93744	13 1.00750	18 1.00431	25 0.98966	31 0.96355	42 0.56234	37 0.97820					
4	417.6 355.5 0.0202	1.18	2 2.61045	9 1.02405	14 0.96674	19 0.99476	26 0.97820	32 0.95782	39 0.47764	38 0.99985					
5	415.5 358.1 0.0204	1.18	1 2.77412	10 0.99158	15 1.02823	20 0.99858	27 1.00304	33 0.95145	40 0.49738	43 0.48655					
6	420.8 360.3 0.0202	1.18				21 0.99603	28 0.99349								

WIND TUNNEL TEST CONDITIONS..... Q 10.294 PT 90.052 PS 1.215 R/L 10.7 MACH 3.480 TEMP 99.5
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 273.8 TC= 276.0 PTC/PSA= 225.39 PSM(22)/PSA= 0.9718
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 500. HEATER TOTAL TEMPERATURE= 510.

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29 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 R. 52473

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKI(5)		
1	1.21	801.37	801.9	122.7	130.1	136.1	0.0	213.7	451.7
2	1.21	795.58	796.1	121.4	126.3	134.0	0.0	228.0	451.3
3	1.21	790.31	790.3	121.8	127.9	134.8	0.0	242.3	449.5
4	1.21	793.47	792.4	119.2	125.7	134.4	0.0	252.7	448.2
5	1.21	794.00	795.1	118.8	125.3	134.4	0.0	262.3	446.5
6	1.21	797.68	798.2	117.9	123.6	134.8	0.0	270.9	444.8

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	800.8	455.8	0.0210	1.18	5	0.85377	6	0.87735	11	0.95827	16	0.99140	23	0.95827	29	0.96846	34	3.82223	35	0.71615
2	794.5	455.8	0.0210	1.18	4	0.80599	7	0.88945	12	1.00605	17	0.99522	24	0.99267	30	0.97037	41	3.82223	36	0.91076
3	790.3	454.0	0.0209	1.18	3	1.49793	8	0.93724	13	1.00669	18	1.00287	25	0.99012	31	0.96209	42	0.70468	37	0.97738
4	793.5	452.3	0.0208	1.18	2	2.63587	9	1.02262	14	0.97101	19	0.99458	26	0.97802	32	0.95827	39	0.63969	38	1.00860
5	792.4	451.0	0.0209	1.18	1	2.79388	10	0.99012	15	1.02134	20	0.99777	27	1.00223	33	0.95062	40	0.66773	43	0.63969
6	797.7	449.6	0.0208	1.18									21	0.99649	28	0.99331				

WIND TUNNEL TEST CONDITIONS..... 0 10.289 PT 90.011 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 794.9 TC= 453.1 PTC/PSA= 654.67 PSM(22)/PSA= 0.9712
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 980. HEATER TOTAL TEMPERATURE= 485.

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29 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 52670

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCN	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1536.10	1536.1	136.1	148.7	153.5	0.0	246.7	433.9	374.6
2	1.21	1520.31	1525.6	134.4	146.5	152.2	0.0	255.8	427.4	376.7
3	1.21	1546.63	1547.7	132.7	144.6	151.3	0.0	263.1	423.1	379.3
4	1.21	1552.42	1552.4	132.7	143.5	151.3	0.0	271.4	421.8	382.4
5	1.21	1562.42	1561.4	131.8	142.2	151.3	0.0	277.4	420.5	384.1
6	1.21	1549.26	1552.9	142.2	140.6	150.4	0.0	284.0	420.1	386.3

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1536.6	377.5	0.0205	1.19	5	0.85429	6	0.88169	11	0.96641	16	0.99763	23	0.95877	29	0.97406	34	3.82170	35	0.72115
2	1519.8	380.1	0.0207	1.19	4	0.80588	7	0.89506	12	1.01228	17	1.00273	24	0.99636	30	0.97661	41	3.82170	36	0.92501
(3	1547.2	383.2	0.0204	1.19	3	1.49836	8	0.94539	13	1.01292	18	1.00973	25	0.99381	31	0.96641	42	0.87850	37	0.98362
4	1555.1	386.3	0.0204	1.19	2	2.63741	9	1.02821	14	0.97661	19	1.00145	26	0.98298	32	0.96514	39	0.80970	38	1.01483
5	1565.1	388.0	0.0204	1.19	1	2.79286	10	0.99699	15	1.02630	20	1.00464	27	1.00591	33	0.95750	40	0.86257	43	0.81507
6	1550.3	390.2	0.0207	1.19									21	1.00400	28	0.99763				

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.023 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.1
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1545.7 TC= 384.2 PTC/PSA= 1272.85 PSM(22)/PSA= 0.9787
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1710. HEATER TOTAL TEMPERATURE= 445.

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29 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 527/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
1	1.21	1798.21	1799.3	111.0	117.5	120.1	0.0	210.7	365.0
2	1.21	1792.42	1795.6	108.4	116.6	119.7	0.0	223.7	366.3
3	1.21	1812.42	1814.0	110.6	115.8	120.5	0.0	235.0	368.5
4	1.22	1817.68	1817.7	108.4	114.5	120.1	0.0	244.5	370.2
5	1.21	1809.79	1810.8	109.3	113.6	121.0	0.0	254.0	373.3
6	1.21	1819.79	1820.3	108.4	112.7	121.8	0.0	261.0	374.1

FR	PTC	IC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA					
1	1799.3	369.1	0.0204	1.19	5	0.85875	6	0.88232	11	0.96323	16	0.99699	23	0.96068	29	0.97342	34	3.82170	35	0.72115
2	1795.1	369.1	0.0204	1.19	4	0.88779	7	0.89586	12	1.01181	17	1.00336	24	0.99636	30	0.97533	41	3.82170	36	0.92564
3	1810.8	371.8	0.0203	1.19	3	1.50345	8	0.94093	13	1.01165	18	1.00846	25	0.99317	31	0.96578	42	0.92564	37	0.98298
4	1816.6	373.1	0.0203	1.19	2	2.64570	9	1.02630	14	0.97279	19	1.00145	26	0.98234	32	0.96387	39	0.85111	38	1.01101
5	1812.9	377.5	0.0204	1.19	1	2.80177	10	0.99381	15	1.02693	20	1.00464	27	1.00782	33	0.95622	40	0.91418	43	0.85811
6	1821.4	377.9	0.0203	1.19							21	1.00527	28	0.99763						

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.023 PS 1.214 R/L 10.7 MACH 3.480 TEMP 99.3
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1809.3 IC= 373.1 PTC/PSA= 1489.99 PSM(22)/PSA= 0.9803
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2030. HEATER TOTAL TEMPERATURE= 425.

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27 AUGUST 1973

SFC TRIST-10 WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 52970

TEMPERATURE DATA---DEGREES FAHRENHEIT---										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCM
1	5.24	1551.37	1547.7	134.3	143.1	147.4	0.0	240.6	437.4	394.0
2	5.26	1555.35	1546.7	133.5	141.6	146.5	0.0	248.4	444.3	402.4
3	5.03	1549.79	1545.1	132.7	139.6	145.7	0.0	254.9	448.2	413.1
4	5.01	1549.79	1542.4	131.8	137.9	144.8	0.0	260.5	454.3	419.2
5	5.01	1541.69	1534.0	129.2	135.3	144.8	0.0	266.2	457.4	420.9
6	5.04	1502.42	1499.6	128.8	134.4	144.8	0.0	271.8	460.4	422.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1551.9	399.0	0.0207	4.84	5 0.87013	6 0.85783	11 0.95622	16 0.95314	23 0.92240	29 0.96390	34 2.85789	35 0.98235			
2	1556.1	412.7	0.0207	4.85	4 0.80863	7 0.94315	12 0.96390	17 0.95391	24 0.97082	30 0.98543	41 1.51657	36 1.15838			
3	1554.0	417.5	0.0207	4.86	3 0.99388	8 0.98850	13 0.93008	18 0.94053	25 0.93623	31 1.00541	42 0.89242	37 1.07152			
4	1549.8	423.2	0.0206	4.85	2 1.35515	9 1.02386	14 0.93777	19 0.92624	26 0.91625	32 1.05384	39 0.86859	38 1.06614			
5	1542.4	425.0	0.0205	4.84	1 1.40051	10 0.99619	15 0.98389	20 0.98158	27 0.93623	33 1.02463	40 0.89319	43 0.86705			
6	1502.9	426.3	0.0209	4.85				21 0.98466	28 0.94238						

WIND TUNNEL TEST CONDITIONS..... Q 7.730 PT 17.990 PS 5.032 R/L 5.3 MACH 1.482 TEMP 101.5
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1542.9 TC= 417.3 PTC/PSA= 306.60 PSM(22)/PSA= 0.9636
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1680. HEATER TOTAL TEMPERATURE= 505.

A-304

27 AUGUST 1973

USFC TRIANGULAR WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 530/0

TEMPERATURE DATA---DEGREES FAHRENHEIT---										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM	
1	5.14	1131.89	1125.6	143.9	155.6	167.0	0.0	241.0	433.1	391.0
2	5.12	1125.58	1122.9	140.9	153.0	158.2	0.0	245.5	437.0	395.8
3	5.15	1144.52	1139.8	140.5	150.0	156.5	0.0	251.4	441.7	401.9
4	5.12	1146.10	1141.4	137.9	147.4	155.2	0.0	255.3	444.3	404.5
5	5.15	1157.16	1150.8	136.6	145.7	154.3	0.0	259.7	448.2	407.9
6	5.12	1150.84	1146.6	135.7	143.5	153.5	0.0	263.1	450.8	410.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1134.5	395.5	0.0207	4.97	5	0.89396	6	0.90300	11	0.98811	16	0.91806	23	0.96175	29	0.95128	34	2.80767	35	0.97304
2	1127.2	400.4	0.0209	4.97	4	0.78250	7	0.95346	12	0.95196	17	0.94593	24	0.99714	30	0.98961	41	1.53412	36	1.14777
3	1146.1	400.1	0.0206	4.95	3	1.03028	8	0.99037	13	0.95120	18	0.93840	25	0.93237	31	1.03631	42	0.81715	37	1.08074
4	1146.1	409.2	0.0207	4.96	2	1.36166	9	1.00919	14	0.95647	19	0.94744	26	0.90601	32	1.03329	39	0.78777	38	1.06342
5	1157.2	411.8	0.0206	4.97	1	1.44827	10	0.99714	15	0.98293	20	0.95723	27	0.93689	33	1.00769	40	0.81564	43	0.79606
6	1152.9	414.9	0.0208	4.98									21	1.01522	28	0.95196				

WIND TUNNEL TEST CONDITIONS..... Q 7.738 PT 17.986 PS 5.136 R/L 5.3 MACH 1.467 TEMP 101.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1144.0 TC= 406.3 PTC/PSA= 222.75 PSM[22]/PSA= 0.9669
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1860. HEATER TOTAL TEMPERATURE= 900.

A-305-

TEST 575 4. 531/0

WIND TUNNEL TEST CONDITIONS..... Q 7.745 PT 17.994 PS 5.198 R/L 5.3 MACH 1.459 TEMP 181.4									
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 843.9 TC= 400.1 PTC/PSA= 162.34 PSM(22)/PSA= 0.9544									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 875. HEATER TOTAL TEMPERATURE= 500.									

A-306

TEST 572 RUN 532/0

WIND TUNNEL TEST CONDITIONS.....													Q	7.761	PT	18.017	PS	5.317	R/L	5.3	MACH	1.444	TEMP	181.1
MODEL ATTITUDE.....													ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..													PTC=	496.7	TC=	350.2	PTC/PSA=	93.42	PSM(22)/PSA=		0.9479			
HEATER PARAMETERS.....													HEATER TOTAL PRESSURE=				540.	HEATER TOTAL TEMPERATURE=				500.		

A-307

27 AUGUST 1975

USFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
FLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 533/6

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.47	507.16	504.5	98.4	96.7	111.8	0.0	202.5	450.8	376.3
2	7.49	506.10	504.0	101.0	97.1	114.5	0.0	205.9	452.6	378.0
3	7.48	508.74	507.7	98.8	96.7	114.5	0.0	209.4	451.3	378.9
4	7.48	511.37	508.7	100.6	98.6	114.9	0.0	213.7	451.3	381.9
5	7.47	510.84	509.3	100.6	98.8	117.5	0.0	216.3	452.1	383.2
6	7.47	511.89	510.3	102.7	99.3	118.8	0.0	220.7	453.4	385.0

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	506.6	380.1	0.0205	6.75	5	0.89653	6	0.99223	11	0.97154	16	1.00517	23	0.90688	29	1.03621	34	1.85410	35	1.14019
2	506.1	381.4	0.0206	6.75	4	0.79720	7	0.96637	12	0.95343	17	1.04914	24	0.99999	30	1.00051	41	1.15674	36	1.01500
3	508.2	382.8	0.0205	6.74	3	0.96068	8	1.00103	13	0.93222	18	1.00517	25	0.91877	31	0.98085	42	0.57579	37	1.02224
4	510.3	385.4	0.0205	6.73	2	1.28970	9	0.98034	14	1.01241	19	1.00206	26	0.99999	32	0.99586	39	0.56854	38	0.91670
5	510.3	387.2	0.0205	6.74	1	1.37506	10	0.97671	15	1.00827	20	0.98447	27	1.01862	33	0.97827	40	0.57992	43	0.57869
6	510.8	388.9	0.0205	6.75																
									</											

WIND TUNNEL TEST CONDITIONS..... 0 7.471 PT 10.013 PS 7.477 R/L 5.5 MACH 1.195 TEMP 100.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS., PTC= 508.7 TC= 384.3 PTC/PSA= 68.04 PSM(22)/PSA= 0.9019
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 500. HEATER TOTAL TEMPERATURE= 520.

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27 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 53470

FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREE FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKI (5)			
1	7.39	851.89	848.7	127.9	137.9	140.0	0.0	218.1	477.7	391.5
2	7.40	857.68	852.9	126.6	136.6	138.7	0.0	223.3	473.8	393.6
3	7.42	859.26	855.6	123.6	134.4	138.7	0.0	228.9	470.4	397.1
4	7.39	858.21	855.6	123.6	132.7	138.7	0.0	235.4	468.6	400.6
5	7.40	865.05	860.8	121.4	130.1	137.9	0.0	239.7	466.5	401.9
6	7.43	870.84	867.2	121.8	129.2	137.9	0.0	244.5	465.2	404.9

FR	PTC	TC P47/PTC	PORT-22	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	NO PSH/PSA	
1	849.8	395.1	0.0206	6.68	5	0.88546	6	0.99673	11	0.97322	16	1.00770	23	0.92255	29	1.03695	34	1.91406	35	1.13569
2	857.7	398.6	0.0205	6.68	4	0.76583	7	0.98367	12	0.96591	17	1.05158	24	1.08039	30	1.01710	41	1.34778	36	1.01501
3	857.2	399.9	0.0206	6.68	3	0.95860	8	0.99412	13	0.93718	18	1.01136	25	0.92412	31	0.98472	42	0.67859	37	1.02598
4	855.1	404.3	0.0207	6.69	2	1.29241	9	0.99203	14	0.99830	19	1.00195	26	1.00143	32	0.98942	39	0.66710	38	0.91053
5	867.2	407.0	0.0205	6.68	1	1.36763	10	0.97322	15	1.00248	20	0.99986	27	1.01554	33	0.98419	40	0.68695	43	0.67807
6	871.4	408.7	0.0206	6.68									21	0.97792	28	1.02598				

WIND TUNNEL TEST CONDITIONS..... 0 7.488 PT 18.007 PS 7.484 R/L 5.5 MACH 1.202 TEMP 99.3
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 859.7 TC= 402.3 PTC/PSA= 116.11 PSH(22)/PSA= 0.9024
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 900. HEATER TOTAL TEMPERATURE= 495.

A-309

27 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 53570

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	856.63	852.9	140.9	153.5	154.3	0.0	223.3	478.2	392.8
2	7.38	858.74	855.1	136.6	150.4	152.2	0.0	229.8	473.0	395.8
3	7.38	864.00	859.8	137.0	147.4	151.3	0.0	234.5	471.2	399.3
4	7.38	867.16	864.0	133.5	143.5	148.7	0.0	237.7	468.2	401.4
5	7.36	873.47	870.3	131.8	141.8	148.3	0.0	244.1	466.9	404.5
6	7.38	877.68	874.0	130.5	139.6	146.5	0.0	249.7	465.2	407.1

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	855.1	396.8	0.0206	6.65	5	0.89093	6	0.99784	11	0.97164	16	1.00885	23	0.92657	29	1.03820	34	1.93122	35	1.13515
2	858.7	399.9	0.0206	6.65	4	0.76410	7	0.98474	12	0.97007	17	1.04973	24	0.99732	30	1.01619	41	1.37578	36	1.01409
3	862.9	403.0	0.0206	6.66	3	0.94543	8	0.98317	13	0.93967	18	1.01723	25	0.92604	31	0.98579	42	0.67763	37	1.02090
4	866.1	405.6	0.0206	6.66	2	1.29342	9	0.99522	14	0.99941	19	1.00308	26	0.99994	32	0.98684	39	0.67082	38	0.91032
5	871.4	407.4	0.0206	6.65	1	1.36417	10	0.97983	15	1.00256	20	1.00361	27	1.01671	33	0.98684	40	0.68864	43	0.67920
6	876.1	410.5	0.0206	6.66																

WIND TUNNEL TEST CONDITIONS..... Q 7.487 PT 17.992 PS 7.381 R/L 5.5 MACH 1.204 TEMP 99.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 865.1 TC= 403.9 PTC/PSA= 117.21 PSM(22)/PSA= 0.9816
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 900. HEATER TOTAL TEMPERATURE= 560.

A-310

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

— RUN 53571

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING	FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.35	1197.68	1191.9	137.0	148.3	147.0	0.0	214.2	481.6	398.4
2	7.34	1186.10	1183.5	134.8	144.8	144.8	0.0	224.1	476.4	403.6
3	7.35	1185.58	1182.4	133.1	142.6	144.8	0.0	231.1	473.8	407.1
4	7.36	1187.16	1181.9	132.2	140.9	143.5	0.0	240.6	471.7	412.3
5	7.36	1201.37	1198.2	130.9	138.7	142.6	0.0	247.5	470.4	416.6
6	7.35	1196.10	1189.8	129.6	137.0	143.5	0.0	254.0	472.1	419.2

FR	PTC	Tc P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	
1	1198.7	402.1	0.0284	6.67	5	0.89163	6	0.99421	11	0.97107	16	0.99316	23	0.93793	29	1.03209	34	1.94950	35	1.12256
2	1182.9	407.0	0.0206	6.67	4	0.76959	7	0.97738	12	0.97896	17	1.04313	24	0.99158	30	1.02209	41	1.38085	36	1.01315
3	1185.1	410.9	0.0206	6.66	3	0.94529	8	0.97317	13	0.94739	18	1.02420	25	0.93003	31	0.99211	42	0.74960	37	1.01262
4	1186.6	415.3	0.0207	6.68	2	1.29984	9	0.99158	14	0.98790	19	1.01052	26	0.99316	32	0.97896	39	0.74066	38	0.91057
5	1200.8	420.6	0.0206	6.68	1	1.37191	10	0.97790	15	1.00526	20	0.99842	27	1.02420	33	0.98843	40	0.76275	43	0.74908
6	1199.3	423.7	0.0207	6.69								21	0.98527	28	1.01736					

WIND TUNNEL TEST CONDITIONS..... Q 7.501 PT 10.004 PS 7.353 R/L 5.5 MACH 1.207 TFP 100.2									
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1192.2 TC= 413.3 PTC/PSA= 162.14 PSM(22)/PSA= 0.9081									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 510.									

A-311

TEST 575 RL 536/0

WIND TUNNEL TEST CONDITIONS.....	0	7.474	PT	18.000	PS	7.443	R/L	5.5	MACH	1.198	TEMP	100.2
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1562.3	TC=	428.4	PTC/PSA=	209.90			PSM(221/PSA=	0.9099		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	1700.	HEATER TOTAL TEMPERATURE=	510.								

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27 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 53710

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.39	1918.21	1911.4	97.5	100.1	99.3	0.0	225.4	431.0	403.6
2	7.40	1938.74	1934.5	98.4	99.7	101.9	0.0	237.1	440.9	412.7
3	7.39	1910.31	1906.6	99.3	100.6	104.5	0.0	247.5	448.7	419.2
4	7.41	1931.89	1923.5	98.8	100.1	107.1	0.0	256.6	456.5	426.1
5	7.40	1898.21	1893.5	99.7	100.6	110.1	0.0	264.9	462.1	430.5
6	7.40	1901.89	1893.5	99.7	99.7	111.9	0.0	272.7	466.5	434.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1919.3	407.0	0.0203	6.87	5	0.89054	6	0.99617	11	0.97212	16	1.00349	23	0.92453	29	1.04062	34	1.93273	35	1.13422
2	1936.6	416.6	0.0202	6.87	4	0.76922	7	0.98676	12	0.97264	17	1.04794	24	1.00297	30	1.02284	41	1.37686	36	1.01709
3	1911.4	423.7	0.0206	6.89	3	0.95277	8	0.98624	13	0.93760	18	1.02023	25	0.92401	31	0.99356	42	0.88165	37	1.02232
4	1931.4	430.7	0.0204	6.89	2	1.30261	9	0.99199	14	1.00349	19	1.00611	26	1.00036	32	1.00008	39	0.86753	38	0.92401
5	1899.8	435.1	0.0207	6.88	1	1.37477	10	0.97421	15	1.00611	20	1.00611	27	1.01866	33	0.99565	40	0.88845	43	0.87329
6	1902.9	438.6	0.0204	6.87																

WIND TUNNEL TEST CONDITIONS..... Q 7.485 PT 17.996 PS 7.397 R/L 5.5 MACH 1.202 TEMP 100.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1916.9 TC= 425.3 PTC/PSA= 259.15 PSM(22)/PSA= 0.9298
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100, HEATER TOTAL TEMPERATURE= 515,

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A-313

TEST 575 RUN 537,1

WIND TUNNEL TEST CONDITIONS.....	Q	7.461	PT	17.986	PS	7.463	R/L	5.5	MACH	1.195	TEMP	100.6
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1896.1	TC=	404.5	PTC/PSA=	254.06	RSM(22)/PSA= 1.0180					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 2100.					HEATER TOTAL TEMPERATURE= 515.						

A-314

TEST 575 RUN 538/3

WIND TUNNEL TEST CONDITIONS.....	Q	6.037	PT	17.994	PS	10.628	R/L	5.1	MACH	0.901	TEMP	100.1
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1883.3	TC=	420.9	PTC/PSA=	177.20			PSM(221/PSA=	0.9542		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	210.			HEATER TOTAL TEMPERATURE=	515.						

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27 AUGUST 1973

 HSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 535/1

		TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE			TCH	
FRAP	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)				
1	10.60	1887.68	1887.2	125.3	133.5	134.8	0.0	218.9	431.8	401.9	
2	10.61	1899.26	1894.5	125.7	132.2	134.4	0.0	228.9	439.1	410.1	
3	10.60	1897.16	1893.5	124.4	131.4	135.3	0.0	239.7	447.5	417.9	
4	10.62	1883.47	1877.7	122.3	129.2	135.3	0.0	248.0	453.4	423.5	
5	10.62	1877.16	1870.3	122.7	128.3	136.1	0.0	255.8	459.5	428.7	
6	10.62	1844.53	1842.4	121.4	127.5	135.3	0.0	263.1	463.4	430.9	

FR	PTC	TC	DAY/10	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1885.2	402.6	0.0206	10.11	5	0.99738	6	0.98024	11	0.95618	16	0.98352	23	0.95764	29	1.00722	34	1.35863	35	1.04003
2	1902.9	414.9	0.0205	10.13	4	0.95254	7	0.96639	12	0.96201	17	1.00503	24	0.96092	30	0.99993	41	1.18127	36	1.03383
3	1896.6	422.4	0.0206	10.13	3	0.88510	8	0.98680	13	0.96894	18	0.99373	25	0.95144	31	0.99592	42	0.96092	37	1.02326
4	1882.4	427.6	0.0207	10.13	2	1.08596	9	0.98061	14	0.97332	19	0.99191	26	0.97332	32	0.99337	39	0.94415	38	0.98712
5	1876.1	432.9	0.0206	10.12	1	1.16032	10	0.96384	15	0.98717	20	0.98790	27	0.99227	33	0.98279	40	0.94889	43	0.95400
6	1841.9	435.6	0.0207	10.10									21	0.97878	28	0.99519				

WIND TUNNEL TEST CONDITIONS..... 0 0.043 PT 17.988 PS 10.611 R/L 5.1 MACH 0.902 TEMP 100.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1880.8 TC= 423.2 PTC/PSA= 177.26 PSM(22)/PSA= 0.9538
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2180. HEATER TOTAL TEMPERATURE= 510.

27 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 539/0

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FRAME	PSA	PTC	-----TEMPERATURE DATA-----DEGREES FAHRENHEIT-----					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.58	1575.05	1567.7	97.1	108.8	118.4	0.0	224.1	458.7	400.2
2	10.58	1564.00	1556.6	98.8	109.7	119.7	0.0	235.0	460.8	412.7
3	10.56	1567.68	1563.5	98.4	108.4	120.1	0.0	242.3	462.6	418.8
4	10.58	1570.31	1567.7	99.7	108.8	121.8	0.0	251.4	465.6	423.1
5	10.57	1575.58	1569.8	98.0	108.4	122.7	0.0	257.1	466.9	427.4
6	10.57	1576.63	1569.8	99.7	108.4	124.0	0.0	263.6	469.9	430.5

FR	PTC	IC P47/PTC	PORT-22 NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO	PSH/PSA NO
1	1577.2	410.0	0.0204	9.83	5 1.00806	6 0.98031	11 0.95727	16 0.98324	23 0.95763	29 1.00372	34 1.35049	35 1.04213				
2	1566.6	417.1	0.0205	9.84	4 0.95580	7 0.96714	12 0.96531	17 1.00555	24 0.96422	30 0.99531	41 1.09371	36 1.03481				
3	1567.2	423.2	0.0206	9.84	3 0.88484	8 0.98836	13 0.96970	18 0.99165	25 0.95178	31 0.98909	42 0.92581	37 1.02165				
4	1569.3	427.6	0.0206	9.86	2 1.09041	9 0.98324	14 0.97373	19 0.98872	26 0.97336	32 0.98434	39 0.91337	38 0.94410				
5	1578.2	431.6	0.0205	9.85	1 1.16467	10 0.96605	15 0.96799	20 0.98287	27 0.99238	33 0.96897	40 0.91740	43 0.92361				
6	1574.5	435.1	0.0206	9.85				21 0.96897	28 0.99421							

WIND TUNNEL TEST CONDITIONS..... Q 6.073 PT 18.000 PS 10.574 R/L 5.1 MACH 0.906 TEMP 108.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1572.2 TC= 424.1 PTC/PSA= 148.68 PSM(22)/PSA= 0.9310
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1700. HEATER TOTAL TEMPERATURE= 510.

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27 AUGUS 1973

SFC TRISONIC WIND TUNNEL MOUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 540/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.59	1173.47	1169.8	107.5	109.3	113.2	0.0	176.4	493.8	393.2
2	10.59	1186.63	1185.1	107.5	108.4	114.2	0.0	188.6	486.0	398.0
3	10.60	1188.21	1182.9	107.1	108.4	114.9	0.0	199.4	479.5	402.3
4	10.60	1188.74	1184.5	107.5	108.8	115.8	0.0	209.4	476.4	406.6
5	10.59	1205.58	1201.4	108.4	109.3	117.9	0.0	217.2	473.8	409.2
6	10.61	1198.74	1192.9	107.5	108.8	118.8	0.0	225.9	472.1	413.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1172.9	396.8	0.0207	9.49	5	0.99782	6	0.97957	11	0.95549	16	0.97921	23	0.95658	29	0.99673	34	1.34491	35	1.04235
2	1184.0	402.1	0.0205	9.48	4	0.95330	7	0.96461	12	0.96133	17	0.99855	24	0.96133	30	0.98687	41	1.09235	36	1.02921
3	1188.2	406.1	0.0205	9.50	3	0.88760	8	0.98633	13	0.96789	18	0.98651	25	0.95147	31	0.98067	42	0.87629	37	1.01607
4	1188.7	410.5	0.0205	9.50	2	1.08687	9	0.98030	14	0.97045	19	0.97994	26	0.97008	32	0.97154	39	0.86680	38	0.90913
5	1205.6	413.1	0.0204	9.50	1	1.15987	10	0.96352	15	0.98359	20	0.97154	27	0.98870	33	0.95111	40	0.87118	43	0.87446
6	1198.2	417.1	0.0206	9.53									21	0.95476	28	0.99125				

WIND TUNNEL TEST CONDITIONS..... Q 6.063 PT 18.007 PS 10.598 R/L 5.1 MACH 0.904 TEMP 100.5
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1189.6 TC= 407.6 PTC/PSA= 112.25 PSM(22)/PSA= 0.8964
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 510.

A=318

27 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 541/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.75	838.21	835.6	98.6	106.7	117.5	0.0	202.0	454.7	388.9
2	10.75	846.10	843.5	99.7	106.2	117.1	0.0	209.4	479.9	393.6
3	10.76	852.95	850.3	99.7	107.1	118.4	0.0	215.5	476.4	395.8
4	10.68	856.63	854.0	98.8	105.6	118.8	0.0	222.0	473.0	398.4
5	10.68	856.10	851.9	99.7	106.2	119.7	0.0	228.0	471.2	401.9
6	10.68	861.37	857.2	100.1	106.2	120.5	0.0	232.8	469.5	404.0

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	838,7	393,3	0,0206	9,43	5	1,00001	6	0,98269	11	0,96502	16	0,98125	23	0,96213	29	0,99748	34	1,31531	35	1,05051
2	843,5	396,4	0,0206	9,42	4	0,95419	7	0,96826	12	0,97007	17	0,99929	24	0,97079	30	0,98774	41	1,09092	36	1,02995
3	851,9	399,5	0,0205	9,45	3	0,90008	8	0,99243	13	0,97512	18	0,98738	25	0,96285	31	0,98125	42	0,84489	37	1,01588
4	853,5	402,1	0,0205	9,34	2	1,07865	9	0,97476	14	0,96682	19	0,97187	26	0,96718	32	0,96177	39	0,82685	38	0,88204
5	856,1	406,1	0,0206	9,34	1	1,15333	10	0,96105	15	0,98017	20	0,96213	27	0,98522	33	0,93832	40	0,82937	43	0,83046
6	862,9	407,8	0,0206	9,35									21	0,94048	28	0,98630				

WIND TUNNEL TEST CONDITIONS..... Q 5.999 PT 18.021 PS 10.722 R/L 5.1 MACH 0.894 TEMP 99.5
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 851.1 TC= 400.9 PTC/PSA= 79.38 PSM(221/PSA= 0.8756
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 900. HEATER TOTAL TEMPERATURE= 508.

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27 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 542/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.65	481.37	478.2	91.0	92.3	93.2	0.0	98.8	183.8
2	10.67	483.47	481.4	91.5	92.3	93.6	0.0	104.9	210.3

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	481.4	199.7	0.0190	9.28	5	0.99548	6	0.97952	11	0.95775	16	0.97734	23	0.95666	29	0.99439	34	1.25378	35	1.04772
2	480.3	205.4	0.0191	9.28	4	0.95050	7	0.96610	12	0.96392	17	0.99621	24	0.96610	30	0.98569	41	1.14096	36	1.02704
3	480.8	209.0	0.0192	9.28	3	0.88628	8	0.98750	13	0.96755	18	0.98242	25	0.95267	31	0.97589	42	0.82388	37	1.01144
4	481.4	212.9	0.0192	9.30	2	1.08037	9	0.98133	14	0.97081	19	0.97662	26	0.97081	32	0.96682	39	0.82316	38	0.88157
5	478.2	216.4	0.0194	9.28	1	1.15511	10	0.96682	15	0.98468	20	0.96573	27	0.98968	33	0.94179	40	0.82171	43	0.81808
6	482.4	220.4	0.0192	9.29								21	0.94324	28	0.99077					

WIND TUNNEL TEST CONDITIONS..... Q 6.028 PT 18.011 PS 10.662 R/L 5.1 MACH 0.899 TEMP 99.5
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 480.8 TC= 210.6 PTC/PSA= 45.09 RSM221/PSA= 0.8709
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 580. HEATER TOTAL TEMPERATURE= 530.

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TEST 575 264 542/1

WIND TUNNEL TEST CONDITIONS..... Q 5.982 PT 18.017 PS 10.747 R/L 5.1 MACH 0.892 TEMP 100.0									
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 505.4 TC= 390.4 PTC/PSA= 47.03 PSN(221)/PSA= 0.8695									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 500, HEATER TOTAL TEMPERATURE= 500,									

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29 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 546/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
1	1.21	1192.91	1191.9	116.2	122.7	128.3	0.0	198.1	434.4
2	1.21	1193.43	1195.0	114.5	121.4	127.9	0.0	215.0	437.4
3	1.21	1179.75	1181.9	113.2	120.1	127.9	0.0	230.6	440.4
4	1.21	1188.17	1186.6	112.3	119.7	128.8	0.0	244.5	443.9
5	1.21	1202.38	1202.4	113.2	118.4	128.3	0.0	257.9	448.7
6	1.21	1210.60	1211.3	112.3	117.5	129.6	0.0	269.6	451.3

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1192.9	438.6	0.0207	1.18	5	0.85358	6	0.87715	11	0.95741	16	0.99117	23	0.95677	29	0.96824	34	3.82135
2	1192.4	440.8	0.0207	1.18	4	0.80516	7	0.88989	12	1.00646	17	0.99690	24	0.99244	30	0.97078	41	3.82135
3	1177.6	444.4	0.0210	1.18	3	1.50204	8	0.98639	13	1.00837	18	1.00454	25	0.98989	31	0.96187	42	0.81408
4	1189.7	447.9	0.0209	1.18	2	2.64864	9	1.02365	14	0.97078	19	0.99435	26	0.97907	32	0.95804	39	0.74656
5	1201.9	453.2	0.0208	1.18	1	2.80725	10	0.99117	15	1.02365	20	0.99881	27	1.00454	33	0.95167	40	0.78860
6	1210.8	456.2	0.0208	1.18									21	0.99817	28	0.99499		

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.031 PS 1.214 RVL 10.7 MACH 3.480 TEMP 99.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1194.2 TC= 446.9 PTC/PSA= 993.35 PSM(22)/PSA= 0.9724
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1380. HEATER TOTAL TEMPERATURE= 990.

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29 AUGUST 1973

PSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 54770

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
1	1.21	1231.33	1232.9	127.9	132.7	150.0	0.0	557.5	564.0
2	1.21	1217.12	1217.6	127.5	131.8	150.4	0.0	555.8	561.4
3	1.21	1221.33	1220.3	128.3	132.7	150.9	0.0	555.3	561.0
4	1.21	1214.49	1212.9	128.3	131.8	152.6	0.0	553.6	558.8
5	1.21	1223.43	1225.5	127.5	131.4	153.5	0.0	551.4	557.5
6	1.21	1212.91	1213.4	127.5	131.4	154.8	0.0	550.6	557.5

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1230.8	570.2	0.0213	1.18	5	0.06062	6	0.87209	11	0.95809	16	0.99695	23	0.96064	29	0.96510	34	3.82152
2	1218.2	568.0	0.0213	1.18	4	0.81094	7	0.88802	12	1.00587	17	0.99376	24	0.98994	30	0.96955	41	3.82152
3	1218.7	566.7	0.0212	1.18	3	1.51039	8	0.94089	13	1.00841	18	1.00268	25	0.99312	31	0.96127	42	0.87018
4	1217.1	564.9	0.0213	1.18	2	2.66978	9	1.02816	14	0.97338	19	0.99249	26	0.98548	32	0.95745	39	0.79246
5	1222.4	563.2	0.0212	1.18	1	2.81948	10	0.99504	15	1.02689	20	0.99631	27	1.01160	33	0.95044	40	0.83323
6	1215.0	563.6	0.0214	1.18									21	0.99567	28	1.00332		

WIND-TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.827 PS 1.214 R/L 10.6 MACH 3.480 TEMP 102.6
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1228.4 TC= 566.1 PIC/PSA= 1004.92 PSH1221/PSA= 0.9713
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 640.

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28 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 548/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]			
1	5.1	1245.58	1241.9	127.9	120.2	98.8	0.0	313.9	669.3	535.4
2	5.09	1242.42	1238.2	125.3	120.1	101.0	0.0	321.7	652.4	535.8
3	5.09	1246.63	1242.9	125.7	119.2	103.2	0.0	329.9	639.9	537.5
4	5.12	1254.52	1249.8	124.4	117.9	106.7	0.0	335.5	629.9	537.5
5	5.07	1259.26	1254.5	125.3	119.2	110.1	0.0	341.6	622.5	539.3
6	5.09	1268.74	1264.5	124.0	117.5	113.2	0.0	346.4	616.4	538.8

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1246.1	541.6	0.0211	4.96	5	0.88928	6	0.87713	11	0.97813	16	0.93408	23	0.94244	29	0.93712	34	2.84933	35	0.97433
2	1244.0	541.6	0.0211	4.93	4	0.79055	7	0.95307	12	0.95611	17	0.94244	24	0.97737	30	0.96826	41	1.68742	36	1.15887
3	1247.2	543.8	0.0210	4.95	3	0.98952	8	0.98876	13	0.93712	18	0.92573	25	0.93788	31	0.99939	42	0.84903	37	1.07685
4	1254.5	543.4	0.0210	4.98	2	1.36239	9	1.01914	14	0.95079	19	0.94016	26	0.91358	32	1.03660	39	0.82052	38	1.06622
5	1259.3	545.1	0.0210	4.91	1	1.39505	10	0.99635	15	0.99332	20	0.97737	27	0.94092	33	1.00243	40	0.85434	43	0.82928
6	1271.4	545.1	0.0209	4.94																

WIND TUNNEL TEST CONDITIONS.....Q 7.737 PT 17.992 PS 5.093 R/L 5.3 MACH 1.473 TEMP 180.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS., PTC= 1253.7 TC= 543.4 PTC/PSA= 246.15 PER(22)/PSA= 0.9707
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 630.

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28 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 549/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.39	1221.89	1217.7	111.9	114.9	109.7	0.0	277.4	684.5	526.7
2	7.39	1211.89	1208.7	112.7	115.3	111.0	0.0	290.5	665.9	529.7
3	7.39	1232.42	1231.4	113.2	114.5	114.9	0.0	300.4	652.4	530.6
4	7.39	1241.37	1237.7	111.4	113.6	117.1	0.0	309.5	639.0	531.5
5	7.38	1245.05	1241.4	112.7	113.6	120.5	0.0	319.1	630.3	533.2
6	7.38	1240.84	1239.8	114.0	113.6	124.4	0.0	325.1	624.7	534.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1224.0	532.8	0.0210	6.77	5	0.89227	6	1.08014	11	0.98024	16	1.01061	23	0.93521	29	1.04622	34	1.95001	35	1.13838
2	1212.9	535.9	0.0213	6.77	4	0.76817	7	0.99333	12	0.97815	17	1.05669	24	1.01271	30	1.02737	41	1.39601	36	1.02161
3	1233.5	537.6	0.0211	6.77	3	0.95406	8	0.98810	13	0.94673	18	1.02527	25	0.93626	31	0.99805	42	0.78545	37	1.03313
4	1241.9	537.6	0.0211	6.77	2	1.31065	9	0.99962	14	1.00957	19	1.01271	26	1.00799	32	0.99962	39	0.77236	38	0.92421
5	1246.1	540.3	0.0211	6.77	1	1.37297	10	0.97972	15	1.01375	20	1.00799	27	1.02894	33	0.99962	40	0.79488	43	0.78021
6	1241.9	540.7	0.0213	6.77									21	0.98967	28	1.02580				

WIND TUNNEL TEST CONDITIONS..... Q 7.487 PT 17.996 PS 7.387 R/L 5.4 MACH 1.204 TEMP 101.4
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1233.4 TC= 537.5 PTC/PSA= 166.97 PSM(22)/PSA= 0.9161
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 630.

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28 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 55070

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.69	1216.63	1213.5	104.9	108.4	113.6	0.0	334.2	532.3
2	10.69	1225.05	1221.9	104.0	108.4	115.3	0.0	339.4	534.9
3	10.71	1234.00	1232.9	106.2	109.3	118.4	0.0	343.3	536.2
4	10.72	1222.95	1221.4	104.9	108.4	120.5	0.0	348.5	537.5
5	10.74	1238.21	1235.1	105.8	108.8	123.6	0.0	352.4	538.8
6	10.74	1240.84	1236.6	107.1	109.7	125.7	0.0	357.2	541.0

FR	PTC	Tc P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	1216.1	538.5	0.0211	9.70	5	0.99626	6	0.98038	11	0.96089	16	0.98038	23	0.95980	29	1.00059	34	1.34892	35	1.04283
2	1224.0	540.7	0.0210	9.71	4	0.95186	7	0.96738	12	0.96666	17	1.00240	24	0.96847	30	0.99157	41	1.12843	36	1.02883
(3	1233.5	541.6	0.0209	9.75	3	0.89411	8	0.99229	13	0.97424	18	0.99157	25	0.96161	31	0.98760	42	0.89627	37	1.02045
4	1223.5	543.8	0.0212	9.74	2	1.09119	9	0.98471	14	0.97460	19	0.98543	26	0.97677	32	0.97930	39	0.88653	38	0.92335
5	1237.7	544.7	0.0211	9.78	1	1.15833	10	0.97460	15	0.99049	20	0.97930	27	0.99662	33	0.96305	40	0.89230	43	0.89664
6	1242.4	547.8	0.0211	9.79																

WIND TUNNEL TEST CONDITIONS..... Q 5.986 PT 17.996 PS 10.716 R/L 5.1 MACH 0.893 TEMP 181.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1229.5 TC= 542.8 PTC/PSA= 114.74 PSH(22)/PSA= 0.9894
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 645.

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28 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 551/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.66	9.79	7.7	114.5	118.8	117.1	0.0	130.9	144.8
2	10.66	9.79	8.2	111.9	117.1	116.2	0.0	129.2	143.5
3	10.68	9.79	8.2	112.7	116.6	114.9	0.0	127.9	143.1
4	10.67	9.79	7.7	111.4	114.9	112.7	0.0	127.9	143.1
5	10.66	9.79	8.2	109.3	113.6	112.7	0.0	126.2	141.8
6	10.66	9.79	7.7	108.4	112.3	111.4	0.0	125.3	141.3

FR	PTC	TC P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	
1	10.3	146.9	0.9467	10.08	5	0.99731	6	0.98244	11	0.96068	16	0.98316	23	0.95995	29	1.00057	34	1.35271	35	1.05025
2	10.3	145.2	0.9467	10.06	4	0.95161	7	0.96684	12	0.96721	17	1.00347	24	0.96721	30	0.99150	41	1.17936	36	1.03031
3	10.3	144.7	0.9506	10.06	3	0.88996	8	0.99005	13	0.97265	18	0.99078	25	0.95850	31	0.98570	42	0.90555	37	1.01870
4	10.8	145.2	0.9063	10.07	2	1.08580	9	0.98425	14	0.97482	19	0.98606	26	0.97555	32	0.97917	39	0.93711	38	0.93312
5	10.8	143.8	0.9035	10.07	1	1.15144	10	0.96938	15	0.98788	20	0.97954	27	0.99332	33	0.96358	40	0.92441	43	0.90737
6	9.8	142.5	0.9946	10.09																

WIND TUNNEL TEST CONDITIONS..... Q 6.016 PT 17.996 PS 10.666 R/L 5.2 MACH 0.898 TEMP 97.2
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC* 10.4 TC* 144.7 PTC/PSA* 0.98 PSM(22)/PSA* 0.9442
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE* 0. HEATER TOTAL TEMPERATURE* 260.

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TEST 575 RUN 552/0

WIND TUNNEL TEST CONDITIONS.....	D	7.465	PT	18.000	PS	7.474	R/L	5.4	MACH	1.195	TEMP	101.3
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	6.1	TC=	252.4	PTC/PSA=	0.82			PSM(22)/PSA=	0.9017		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	1300.			HEATER TOTAL TEMPERATURE=	638.						

TEST 575 RUN 55370

WIND TUNNEL TEST CONDITIONS.....	Q	7.744	PT	17.988	PS	5.218	R/L	5.4	MACH	1.456	TEMP	97.3
MODEL ATTITUDE.....	ALPHA	0.04	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	4.2	TC=	160.4	PTC/PSA=	0.00	PSM(221)/PSA= 0.9541					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=				0,	HEATER TOTAL TEMPERATURE= 0,						

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29 AUGUST 1975

USFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 554/6

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	0.28	0.8	105.3	106.7	111.0	0.0	124.4	879.1	138.7
2	1.21	0.28	0.3	103.2	105.6	109.3	0.0	123.6	878.7	137.4
3	1.21	0.28	0.3	101.9	104.9	108.4	0.0	123.1	878.7	137.0
4	1.21	0.25	0.3	103.2	104.5	108.0	0.0	123.1	879.1	136.1
5	1.21	0.28	0.3	100.6	103.2	107.1	0.0	122.3	879.1	135.3
6	1.22	0.25	0.6	100.6	102.3	105.8	0.0	122.7	879.6	135.3

FR	PTC	TC P49/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	0.3	139.4-1.4957	1.18	5 0.84147	6 0.88606	11 0.95868	16 0.98798	23 0.95804	29 0.97142	36 0.92135	39 0.72490				
2	0.8	139.0 0.4438	1.18	4 0.78860	7 0.89626	12 1.00582	17 0.98862	24 0.98926	30 0.97206	41 3.82135	36 0.92619				
3	0.3	138.1 1.2564	1.18	3 1.46637	8 0.93957	13 1.00582	18 1.00327	25 0.98607	31 0.96250	42 0.39175	37				
4	0.3	137.7 1.3654	1.18	2 2.57602	9 1.02557	14 0.96633	19 0.99626	26 0.97333	32 0.95932		38 0.98735				
5	0.8	136.4 0.4687	1.18	1 2.73973	10 0.99372	15 1.01920	20 1.00072	27 0.99617	33 0.95167	40 0.2567	43 0.30767				
6	0.8	136.8 0.4563	1.18				21 0.99754	28 0.98735							

WIND TUNNEL TEST CONDITIONS..... 0 10.291 PT 10.031 PS 1.214 R/L 10.7 MACH 3.480 TEMP 101.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 0.5 TC= 137.5 PTC/PSA= 0.37 PSM(22)/PSA= 0.9727
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 950.

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30 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 601/0

ORIGINAL PAGE IS
OF POOR QUALITY

TEMPERATURE DATA--DEGREES FAHRENHEIT--										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1		1123.96	1065.6	64.2	60.7	54.2	150.4	78.9	270.5	154.8
2		1085.54	1032.2	63.3	59.4	54.2	148.3	84.5	239.7	140.0
3		1066.07	1017.0	63.3	59.8	55.5	152.6	88.0	213.7	129.2
4		1066.59	1017.4	63.7	59.8	56.4	150.0	91.5	190.3	120.1
5		1069.75	1020.0	63.3	59.8	56.8	150.9	92.3	168.2	110.1
6		1070.80	1021.3	63.3	61.1	56.8	151.3	93.6	149.1	101.0

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1118.70	14.49	154.8	0.02046	0.02159	0.02157	0.02090	0.02107	0.02090
2	1085.54	14.49	141.8	0.02115	0.02235	0.02247	0.02164	0.02197	0.02165
3	1066.59	14.49	130.5	0.02153	0.02274	0.02290	0.02201	0.02237	0.02204
4	1067.12	14.49	121.4	0.02145	0.02271	0.02288	0.02199	0.02230	0.02200
5	1069.75	14.49	111.4	0.02144	0.02267	0.02282	0.02194	0.02228	0.02195
6	1072.38	14.49	102.7	0.02138	0.02262	0.02279	0.02189	0.02222	0.02190

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 0. ALPHA= 0.00

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30 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 60270

FRAME	PSA	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH		
		PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)			SKIN(5)	
1		988.70	952.8	73.7	76.3	77.2	151.7	120.1	466.0	343.8
2		976.06	941.6	75.0	75.9	77.2	148.3	136.6	452.0	348.1
3		977.64	942.9	74.1	76.3	78.5	147.6	152.2	441.7	349.8
4		964.49	933.3	74.6	76.3	78.0	150.4	165.2	431.3	351.1
5		976.59	942.9	75.4	76.3	78.9	148.3	178.2	425.3	353.7
6		976.59	943.7	75.9	77.2	80.2	148.3	189.4	419.6	355.5

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	989.22	14.49	343.3	0.02278	0.02398	0.02395	0.02342	0.02372	0.02354
2	976.59	14.49	348.1	0.02297	0.02418	0.02413	0.02361	0.02394	0.02374
3	979.75	14.49	349.8	0.02285	0.02402	0.02400	0.02344	0.02377	0.02372
4	963.96	14.49	350.7	0.02316	0.02437	0.02434	0.02378	0.02413	0.02413
5	976.06	14.49	353.7	0.02294	0.02414	0.02410	0.02356	0.02389	0.02387
6	977.64	14.49	355.9	0.02296	0.02415	0.02415	0.02358	0.02390	0.02389

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 445. ALPHA= 0.00

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29 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
FLUID TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 603/6

FRAME	PSA	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH	
		PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1		558.17	599.1	242.3	268.8	299.1	150.4	384.1	535.8	463.0
2		561.85	601.7	240.6	268.3	298.3	148.3	387.1	537.5	468.2
3		562.38	602.1	239.3	267.5	297.8	152.6	389.7	539.3	473.0
4		564.49	603.9	240.6	267.9	297.8	151.3	394.1	543.2	477.3
5		569.22	606.9	241.0	267.5	298.3	152.2	396.7	544.5	481.2
6		565.54	604.7	238.9	265.7	297.4	152.2	399.7	547.1	484.7

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	558.17	14.49	463.0	0.02386	0.02540	0.02534	0.02455	0.02479	0.02533
2	561.33	14.49	468.6	0.02376	0.02533	0.02525	0.02451	0.02472	0.02525
3	561.85	14.49	472.5	0.02382	0.02535	0.02530	0.02454	0.02479	0.02528
4	563.96	14.49	477.3	0.02386	0.02540	0.02533	0.02460	0.02482	0.02533
5	570.28	14.49	481.6	0.02374	0.02524	0.02519	0.02445	0.02466	0.02521
6	568.17	14.49	485.1	0.02393	0.02546	0.02539	0.02462	0.02486	0.02539

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 680. ALPHA= 0.04

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29 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 60470

FRAME	PSA	TEMPERATURE DATA--DEGREES FARRENHEIT--					MODEL-STING FEEDER-PIPE			TCH
		PTC	SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]			
1		1068.70	1026.9	182.9	183.6	184.2	152.6	422.7	573.1	527.6
2		1069.22	1021.8	183.8	184.7	187.7	148.7	428.7	577.4	532.3
3		1076.59	1026.1	186.8	186.8	190.3	152.2	435.2	582.6	536.2
4		1074.49	1023.9	188.1	186.4	193.3	147.8	440.4	586.5	541.0
5		1078.17	1024.8	189.0	189.4	196.0	147.8	446.5	590.0	544.5
6		1079.22	1027.4	191.6	189.4	199.9	152.2	452.6	593.9	547.1

FRAME	PTC	PSC	TC	PSN[44]/PTC	PSN[45]/PTC	PSN[46]/PTC	PSN[47]/PTC	PSN[48]/PTC	PSN[49]/PTC
1	1067.12	14.49	528.4	0.02409	0.02546	0.02539	0.02489	0.02494	0.02539
2	1068.70	14.49	532.3	0.02414	0.02552	0.02544	0.02465	0.02498	0.02544
3	1076.59	14.49	537.1	0.02403	0.02541	0.02533	0.02455	0.02489	0.02533
4	1076.07	14.49	540.6	0.02411	0.02550	0.02541	0.02464	0.02499	0.02540
5	1082.91	14.49	543.6	0.02404	0.02541	0.02533	0.02456	0.02491	0.02533
6	1081.33	14.49	548.0	0.02412	0.02540	0.02548	0.02464	0.02499	0.02543

TUNNEL STATIC PRESSURE= 2.610

HEATER TOTAL PRESSURE= 1100.

HEATER TOTAL TEMPERATURE= 648.

ALPHA= 0.04

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29 AUGUST 1973

USFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 605/0

FRAME	PSA	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCM
		PTC	SKIN[1]	SKIN[2]	SKIN[3]	SKIN[4]	SKIN[5]		
1		1462.91	1345.2	235.8	266.2	315.4	150.0	439.6	547.1
2		1472.91	1352.5	235.0	265.7	310.4	152.2	446.5	551.0
3		1483.96	1362.9	236.7	265.7	310.8	151.7	454.8	555.3
4		1465.54	1346.0	236.7	264.9	310.4	152.6	460.4	558.8
5		1460.80	1343.0	237.6	264.9	310.8	149.1	467.8	562.7
6		1445.54	1332.6	238.4	264.4	311.3	148.3	473.8	565.3

FRAME	PTC	PSC	TC	PSN[44]/PTC	PSN[45]/PTC	PSN[46]/PTC	PSN[47]/PTC	PSN[48]/PTC	PSN[49]/PTC
1	1466.07	14.49	547.5	0.02406	0.02542	0.02535	0.02459	0.02493	0.02538
2	1473.43	14.49	551.4	0.02400	0.02532	0.02524	0.02450	0.02486	0.02531
3	1484.49	14.49	556.6	0.02380	0.02511	0.02506	0.02435	0.02467	0.02510
4	1468.17	14.49	559.2	0.02401	0.02533	0.02526	0.02454	0.02488	0.02531
5	1462.38	14.49	563.6	0.02392	0.02523	0.02518	0.02444	0.02478	0.02522
6	1443.96	14.49	565.7	0.02408	0.02530	0.02502	0.02461	0.02495	0.02537

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 650. ALPHA= 0.04

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29 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST NOZZLE CALIBRATION PHASE

TEST 575 RUN 606/8

TEMPERATURE DATA---DEGREES FAHRENHEIT---										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING	FEEDER-PIPE	TCH
1		1808.17	1629.5	169.4	212.9	228.9	148.7	385.4	595.2	547.1
2		1766.07	1596.6	169.3	212.4	229.6	148.3	397.1	597.0	550.6
3		1761.33	1591.8	192.0	212.0	231.9	151.7	409.2	601.7	554.0
4		1758.17	1587.9	192.9	213.7	232.8	147.4	418.3	603.4	556.6
5		1728.70	1564.5	192.5	213.3	234.1	150.0	427.9	604.3	559.2
6		1701.33	1543.3	195.1	213.7	235.8	148.3	436.5	607.8	562.3

FRAME	PTC	PSC	TC	PSN(44)/PTC	PSN(45)/PTC	PSN(46)/PTC	PSN(47)/PTC	PSN(48)/PTC	PSN(49)/PTC
1	1813.43	14.49	547.1	0.02360	0.02329	0.02504	0.02426	0.02458	0.02501
2	1769.75	14.49	550.6	0.02390	0.02558	0.02533	0.02456	0.02487	0.02532
3	1761.85	14.49	554.9	0.02372	0.02539	0.02515	0.02440	0.02469	0.02514
4	1759.22	14.49	557.5	0.02343	0.02501	0.02486	0.02411	0.02438	0.02483
5	1730.28	14.49	559.7	0.02364	0.02518	0.02505	0.02431	0.02458	0.02501
6	1701.85	14.49	562.7	0.02377	0.02526	0.02513	0.02446	0.02474	0.02516

TUNNEL STATIC PRESSURE= 2.610 HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 650. ALPHA= 0.04

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31 AUGUST 1973

 HSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 607/0

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.56	1487.64	1487.6	91.5	91.0	101.0	147.8	144.4	284.8	280.5
2	10.56	1492.38	1491.9	92.3	91.9	101.9	147.8	151.7	294.4	287.0
3	10.59	1495.54	1497.1	91.0	92.3	103.2	148.3	157.8	303.0	293.1
4	10.59	1509.22	1507.6	92.3	92.8	104.0	151.3	164.3	309.1	297.0
5	10.60	1521.85	1519.7	93.6	94.5	105.3	150.4	170.8	316.0	301.7
6	10.59	1517.12	1518.7	94.1	94.9	106.2	150.0	175.6	320.8	305.6

FR	PTC	TC	P47/PTC	PORT-22 NO	PSH/PSA NO	PSH/PSA NO	PSM/PSA NO	PSH/PSA NO	PSM/PSA NO	PSH/PSA NO	PSM/PSA NO	PSH/PSA NO	PSM/PSA NO
1	1488.2	281.4	0.0232	9.55	5 0.99693	6 0.97902	11 0.95271	16 0.97756	23 0.95673	29 1.00716	34 0.90045	35 1.04370	
2	1492.9	288.3	0.0232	9.54	4 0.95052	7 0.96148	12 0.96002	17 1.01520	24 0.96404	30 0.98925	41 0.86902	36 1.02989	
3	1495.5	293.5	0.0233	9.55	3 0.88656	8 0.98706	13 0.96733	18 0.98560	25 0.95052	31 0.98450	42 0.86939	37 1.01410	
4	1512.9	297.4	0.0232	9.57	2 1.08682	9 0.97829	14 0.97061	19 0.98231	26 0.96952	32 0.97098	39 0.85477	38 0.92859	
5	1519.7	302.6	0.0232	9.60	1 1.15370	10 0.96586	15 0.98523	20 0.97317	27 0.99108	33 0.95855	40 0.88729	43 0.80058	
6	1515.5	305.6	0.0234	9.59				21 0.95636	28 0.99291				

WIND TUNNEL TEST CONDITIONS..... Q 6.080 PT 18.019 PS 10.584 R/L 5.1 MACH 0.936 TEMP 101.0
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1504.1 TC= 294.8 PTC/PSA= 142.11 PSM(22)/PSA= 0.9837
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1700. HEATER TOTAL TEMPERATURE= 375.

ORIGINAL PAGE IS
OF POOR QUALITY

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TEST 375 RUN 60870

WIND TUNNEL TEST CONDITIONS..... Q 7.517 PT 18.015 PS 7.316 R/L 5.5 MACH 1.212 TEMP 99.7									
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1583.2 TC= 335.8 PTC/PSA= 216.41 PSM1221/PSA= 0.9293									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1700. HEATER TOTAL TEMPERATURE= 395.									

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31 AUGUST 1973

MSFC TRISOLITE 1RD TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 60970

FRAME	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE				TCM
	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.18	1255.54	1254.5	106.7	105.8	122.3	156.4	141.3	443.5	192.9
2	5.19	1254.49	1256.6	105.8	108.0	121.4	150.4	142.6	388.4	173.8
3	5.24	1256.59	1255.0	105.3	107.1	120.5	151.3	142.6	340.3	156.1
4	5.23	1260.28	1261.3	104.5	106.2	117.9	147.8	141.3	296.1	139.2
5	5.24	1264.49	1264.5	104.9	106.2	114.5	151.3	139.6	257.1	123.6
6	5.22	1263.96	1265.5	104.0	105.6	110.6	150.9	136.1	220.7	110.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1256.1	193.8	0.0226	5.00	5	0.87315	6	0.89465	11	0.95247	16	0.93764	23	0.94061	29	0.94209	34	0.96581	35	0.96729
2	1254.0	174.7	0.0225	5.01	4	0.79236	7	0.93319	12	0.93319	17	0.94728	24	1.00509	30	0.99620	41	0.80126	36	1.12739
3	1258.7	157.4	0.0224	5.05	3	1.02585	6	1.04808	13	0.96803	18	0.96358	25	0.93616	31	1.06068	42	0.80200	37	1.05475
4	1260.3	140.9	0.0224	5.03	2	1.38311	9	0.99620	14	0.92356	19	0.97767	26	0.90503	32	0.98360	39	0.79236	38	1.06958
5	1265.0	125.7	0.0223	5.09	1	1.44315	10	1.00213	15	0.94061	20	1.02066	27	0.93838	33	1.00361	40	0.87834	43	0.81905
6	1264.0	112.3	0.0223	5.05									21	1.80806	28	0.93023				

WIND TUNNEL TEST CONDITIONS..... 0 7.752 PT 18.007 PS 5.218 R/L 5.4 MACH 1.457 TEMP 98.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1259.7 TC= 150.8 PTC/PSA= 241.39 PSM[22]/PSA= 0.9653
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 0.

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USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 611/1

ORIGINAL PAGE IS
OF POOR QUALITY

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1467.12	1465.5	131.8	141.3	154.3	147.4	234.1	561.3	425.2
2	1.21	1450.60	1454.5	130.1	139.6	153.9	150.4	250.6	551.4	458.2
3	1.21	1474.49	1475.0	129.2	137.9	153.9	152.6	265.3	544.1	462.6
4	1.21	1459.75	1461.9	128.8	137.4	152.2	150.0	279.2	538.8	468.2
5	1.21	1475.54	1478.7	129.2	136.1	152.2	151.3	291.8	536.2	471.7
6	1.22	1482.38	1481.9	127.0	134.8	150.9	148.3	303.5	533.6	475.1

FR	PTC	TC P47/PTC	PORT=22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1467.1	454.8	0.0239	1.22	5	0.83256	6	0.87205	11	0.94594	16	0.98480	23	0.94339	29	0.93639	34	0.97270	35	0.71089
2	1449.2	458.2	0.0242	1.22	4	0.78160	7	0.87842	12	0.99690	17	0.96250	24	0.98607	30	0.95040	41	1.09181	36	0.90963
3	1473.4	462.1	0.0239	1.22	3	1.47529	8	0.92938	13	0.99945	18	0.98671	25	0.98034	31	0.94976	42	1.10137	37	0.98034
4	1458.7	467.8	0.0242	1.23	2	2.59895	9	0.99754	14	0.96951	19	0.99435	26	0.96760	32	0.94530	39	1.15934	38	1.01219
5	1471.3	471.7	0.0241	1.23	1	2.63207	10	0.97652	15	1.01091	20	1.03321	27	0.98735	33	0.94339	40	2.53652	43	1.13047
6	1487.1	474.3	0.0241	1.23									21	0.99244	28	0.97907				

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.031 PS 1.214 R/L 10.5 MACH 3.480 TEMP 107.8
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1467.8 TC= 464.8 PTC/PSA= 1208.63 PSM(22)/PSA= 1.0097
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 560.

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31 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 612/3

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	5.15	1196.59	1195.0	107.1	112.7	110.1	152.6	428.7	884.5
2	5.15	1196.17	1197.1	106.7	111.4	110.1	147.8	427.4	769.0
3	5.22	1205.54	1205.5	107.1	111.0	111.0	148.3	424.4	740.4
4	5.15	1211.05	1212.4	107.1	111.0	112.3	149.1	422.2	715.7
5	5.19	1223.96	1222.4	107.5	110.6	112.7	150.0	420.1	695.3
6	5.16	1232.38	1231.3	108.4	111.0	113.6	152.6	417.9	678.4

FR	PTC	TC	P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1197.1	550.0	0.0244	5.04	5 0.89046	6 0.91285	11 0.97779	16 0.93151	23 0.96361	29 0.91659	34 0.98078	35 0.97406		
2	1198.7	552.7	0.0245	5.02	4 0.80313	7 0.94719	12 0.94196	17 0.94420	24 1.01660	30 0.99794	41 0.84269	36 1.13155		
3	1204.5	554.5	0.0245	5.02	3 1.04273	8 1.01063	13 0.96361	18 0.95316	25 0.94047	31 1.01735	42 0.84344	37 1.08079		
4	1210.3	554.9	0.0245	5.05	2 1.37264	9 1.00018	14 0.95913	19 0.97257	26 0.90837	32 1.01362	39 0.82552	38 1.09274		
5	1224.0	554.9	0.0244	5.03	1 1.44355	10 1.00466	15 0.95017	20 0.97480	27 0.95092	33 1.01010	40 0.89942	43 0.84642		
6	1232.4	553.2	0.0244	5.03				21 1.01436	28 0.94860					

WIND TUNNEL TEST CONDITIONS..... Q 7.750 PT 18.009 PS 5.182 R/L 5.3 MACH 1.462 TEMP 100.5
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 HOLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1211.2 TC= 553.4 PTC/PSA= 233.72 PSM[22]/PSA= 0.9709
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 830.

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31 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 615/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODFL-STING FEEDER-PIPE	TCH
1	10.72	832.38	829.7	100.6	103.2	118.8	147.8	192.5	375.4
2	10.74	829.75	829.2	99.3	103.2	118.8	152.2	198.6	377.2
3	10.71	830.80	830.3	101.4	104.5	120.5	152.2	204.6	378.5
4	10.71	830.28	828.7	99.3	103.2	120.5	152.6	208.5	379.8
5	10.70	832.91	831.9	100.1	103.6	121.4	147.8	213.3	381.9
6	10.73	838.17	837.1	99.7	103.6	121.8	152.2	216.8	381.9

FR	PTC	IC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	832.9	376.3	0.0236	9.30	5	0.99459	6	0.97835	11	0.95669	16	0.97365	23	0.95633	29	1.00289	34	0.86395	35	1.04439
2	828.7	376.7	0.0237	9.32	4	0.95056	7	0.96355	12	0.96391	17	1.01263	24	0.96824	30	0.98484	41	0.79935	36	1.02562
3	830.8	379.3	0.0237	9.30	3	0.89210	8	0.98592	13	0.96716	18	0.98087	25	0.95344	31	0.97798	42	0.81270	37	1.00830
4	829.7	380.2	0.0238	9.28	2	1.08011	9	0.97546	14	0.96608	19	0.97293	26	0.96571	32	0.95050	39	0.77337	38	0.88560
5	833.4	382.8	0.0238	9.28	1	1.14363	10	0.96355	15	0.97726	20	0.96030	27	0.98484	33	0.93937	40	0.79899	43	0.80837
6	837.1	382.4	0.0237	9.29																
		</																		

WIND TUNNEL TEST CONDITIONS..... 0 5.990 PT 18.004 PS 10.718 R/L 5.1 MACH 0.894 TEMP 97.5
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 832.1 TC= 379.6 PTC/PSA= 77.64 PSM(221)/PSA= 0.8673
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 900. HEATER TOTAL TEMPERATURE= 450.

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31 AUGUST 1973

SEC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 61670

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.65	1149.22	1147.6	112.7	113.6	108.4	150.0	211.2	497.7	385.4
2	10.64	1147.12	1140.6	112.6	112.7	111.9	152.6	207.7	485.5	386.3
3	10.64	1143.43	1143.4	111.4	112.7	111.4	153.0	214.2	475.6	387.6
4	10.62	1142.38	1139.2	110.1	112.3	110.6	152.6	220.2	466.9	388.4
5	10.62	1147.12	1146.6	110.6	111.0	111.9	147.8	225.	460.4	390.6
6	10.62	1152.91	1151.9	109.7	111.0	112.7	150.4	229.8	453.9	391.0

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1149.7	385.8	0.0237	9.43	5	0.99697	6	0.98023	11	0.95586	16	0.97551	23	0.95805	29	1.08533	34	0.88312	35	1.04352
2	1146.1	386.3	0.0237	9.40	4	0.94895	7	0.96132	12	0.95987	17	1.01224	24	0.96387	30	0.98569	41	0.83947	36	1.02570
3	1143.4	386.0	0.0237	9.41	3	0.88712	8	0.98569	13	0.96678	18	0.98278	25	0.95114	31	0.98060	42	0.83875	37	1.01188
4	1144.5	389.7	0.0237	9.39	2	1.08390	9	0.97551	14	0.96714	19	0.97623	26	0.96641	32	0.96350	39	0.81365	38	0.90567
5	1145.0	391.0	0.0238	9.40	1	1.14791	10	0.96241	15	0.97805	20	0.96459	27	0.98533	33	0.94604	40	0.83729	43	0.85148
6	1153.4	391.5	0.0237	9.38									21	0.94459	28	0.98787				

WIND TUNNEL TEST CONDITIONS..... Q 6.045 PT 18.011 PS 10.634 R/L 5.2 MACH 0.981 TEMP 97.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1147.0 TC= 388.7 PTC/PSA= 187.86 PSM(22)/PSA= 0.8840
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 480.

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31 AUGUST 1973

SFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIETSCENT PHASE

TEST 575 RUN 017/J

TEMPERATURE DATA---DEGREES FAHRENHEIT---										
FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM	
1	10.64	1532.91	1531.9	141.3	155.6	160.2	152.6	216.8	494.2	403.6
2	10.66	1539.75	1536.7	138.7	152.6	157.4	150.4	225.4	483.4	406.6
3	10.63	1537.12	1535.0	138.3	150.4	156.5	148.7	233.7	476.9	409.7
4	10.62	1558.17	1556.6	136.1	146.5	155.6	148.3	240.2	471.2	412.3
5	10.62	1556.59	1555.5	134.4	143.9	153.0	148.3	246.2	467.3	414.4
6	10.63	1545.54	1549.2	133.5	143.1	153.0	150.0	251.4	465.6	415.7

FR	PTC	TC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1533.4	404.0	0.0238	9.70	5 0.99587	6 0.97914	11 0.95659	16 0.97732	23 0.95732	29 1.00642	34 0.91149	35 1.04170			
2	1541.3	407.1	0.0238	9.72	4 0.95223	7 0.96496	12 0.96496	17 1.01552	24 0.96678	30 0.99115	41 0.88785	36 1.02970			
3	1536.6	409.7	0.0238	9.70	3 0.88785	8 0.98424	13 0.96859	18 0.98569	25 0.95186	31 0.98460	42 0.88494	37 1.01479			
4	1558.2	412.7	0.0236	9.70	2 1.08462	9 0.97623	14 0.97041	19 0.98169	26 0.96969	32 0.97078	39 0.86930	38 0.93440			
5	1555.5	414.0	0.0237	9.70	1 1.14937	10 0.96387	15 0.98096	20 0.97114	27 0.98787	33 0.95696	40 0.89985	43 0.90058			
6	1540.8	416.6	0.0240	9.71				21 0.95696	28 0.99115						

WIND TUNNEL TEST CONDITIONS..... Q 6.045 PT 18.011 PS 10.634 R/L 5.2 MACH 0.901 TEMP 98.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1544.3 TC= 410.7 PTC/PSA= 145.22 PSM(22)/PSA= 0.9128
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1700. HEATER TOTAL TEMPERATURE= 480.

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31 AUGUST 1973

SFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 618/3

FRAME	-SA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.63	1865.01	1866.1	118.8	123.1	124.4	151.7	198.6	408.5
2	18.62	1868.70	1866.2	117.1	121.8	123.6	150.0	209.8	406.2
3	10.63	1866.07	1869.2	116.2	121.0	123.6	150.9	221.1	408.4
4	10.63	1865.54	1866.1	114.9	119.7	123.6	152.6	228.5	410.5
5	10.64	1870.28	1870.3	115.8	119.7	124.4	151.3	238.0	414.4
6	10.65	1896.59	1898.7	115.8	118.8	125.3	152.6	243.6	416.6

FR	PTC	TC	P47/PTC	PORT-22	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA	NO	PSH/PSA
1	1866.5	403.2	0.0237	9.97	5	0.99430	6	0.97757	11	0.95466	16	0.97903	23	0.95612	29	1.00994	34	0.93575	35	1.04267
2	1869.7	406.6	0.0236	9.95	4	0.94848	7	0.96157	12	0.96048	17	1.01540	24	0.96339	30	0.99285	41	0.91829	36	1.02885
3	1865.5	408.8	0.0237	9.97	3	0.88774	8	0.98667	13	0.96994	18	0.99067	25	0.95393	31	0.99103	42	0.91829	37	1.02012
4	1866.1	411.8	0.0238	9.98	2	1.08595	9	0.97757	14	0.97248	19	0.98812	26	0.97212	32	0.98012	39	0.90556	38	0.95830
5	1870.8	414.4	0.0238	9.98	1	1.14887	10	0.96521	15	0.98412	20	0.97976	27	0.99139	33	0.97103	40	0.94557	43	0.93211
6	1898.2	417.5	0.0236	10.00									21	0.97103	28	0.99612				

WIND TUNNEL TEST CONDITIONS..... Q 6.045 PT 18.013 PS 10.636 R/L 5.2 MACH 0.901 TEMP 98.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1872.5 TC= 410.4 PTC/PSA= 176.05 PSH(221)/PSA= -0.9378
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 470.

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31 AUGUST 1967

WIND TUNNEL TEST...NON-QUIESCENT PHASE

TEST 575 40.61970

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.33	1865.54	1867.1	96.7	93.2	93.2	147.6	191.6	464.7	374.6
2	7.34	1868.70	1872.4	95.4	93.2	94.5	150.9	202.9	440.5	374.1
3	7.34	1896.07	1894.0	96.2	94.1	95.8	150.0	212.0	439.6	375.4
4	7.33	1880.80	1879.7	95.8	93.2	97.5	151.3	219.8	430.9	376.3
5	7.34	1898.70	1901.9	97.1	94.1	98.8	148.3	226.7	426.1	378.5
6	7.34	1902.38	1905.0	97.5	94.5	100.1	148.3	232.4	422.2	379.8

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1868.7	374.6	0.0237	6.86	5	0.88796	6	0.99658	11	0.96600	16	1.04351	23	0.93753	29	1.03982	34	0.93858	35	1.13843
2	1869.2	375.0	0.0237	6.86	4	0.76194	7	0.97866	12	0.97655	17	1.07515	24	0.99606	30	1.01662	41	0.84420	36	1.00238
3	1895.5	375.9	0.0234	6.86	3	0.94702	8	0.97444	13	0.94491	18	1.04879	25	0.93278	31	0.99711	42	0.84314	37	1.01926
4	1880.8	376.7	0.0236	6.86	2	1.30136	9	0.99395	14	0.99026	19	1.03771	26	0.99500	32	0.97391	39	0.83101	38	0.94016
5	1897.6	379.3	0.0235	6.86	1	1.35778	10	0.97549	15	1.00397	20	1.02664	27	1.02559	33	0.99606	40	0.91169	43	0.85474
6	1903.4	380.6	0.0236	6.86									21	1.01451	28	1.02084				

WIND TUNNEL TEST CONDITIONS..... Q 7.511 PT 18.015 PS 7.336 R/L 5.5 MACH 1.210 TEMP 99.4
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1885.9 TC= 377.0 PTC/PSA= 257.09 PSM(22)/PSA= 0.9352
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 430.

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	7.41	1219.22	1218.7	114.5	113.0	118.4	150.4	219.8	478.2	392.8
2	7.43	1225.01	1223.4	113.6	112.3	118.4	150.4	226.7	473.4	394.5
3	7.41	1230.28	1229.2	114.0	112.7	120.5	152.6	233.7	464.7	396.2
4	7.42	1225.01	1225.0	113.6	111.4	124.4	148.3	238.9	460.0	398.8
5	7.42	1237.12	1237.1	111.9	110.6	126.6	150.0	243.2	456.1	399.3
6	7.42	1247.54	1246.1	114.0	111.4	129.2	152.2	248.0	454.3	399.7

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA		
1	1220.3	392.8	0.0237	6.79	5	0.89216	6	0.99332	11	0.96464	16	1.01678	23	0.91719	29	1.03660	34	0.91302	35	1.13984
2	1224.5	395.4	0.0237	6.79	4	0.77223	7	0.97559	12	0.96151	17	1.06319	24	1.00218	30	1.00635	41	0.74773	36	1.00166
3	1230.3	396.7	0.0237	6.79	3	0.95630	8	0.99332	13	0.93596	18	1.01730	25	0.92397	31	0.98550	42	0.74512	37	1.02825
4	1224.5	399.3	0.0239	6.78	2	1.29575	9	0.98185	14	1.00583	19	1.01157	26	1.00010	32	0.99175	39	0.73000	38	0.93387
5	1236.6	399.3	0.0238	6.79	1	1.35571	10	0.97298	15	1.00375	20	1.00270	27	1.01470	33	0.98654	40	0.77693	43	0.76024
6	1248.2	400.6	0.0237	6.80									21	0.98915	28	1.02617				

WIND TUNNEL TEST CONDITIONS.....										Q	7.484	PT	18.007	PS	7.418	R/L	5.5	MACH	1.201	TEMP	98.2	
MODEL ATTITUDE.....										ALPHA	0.00	BETA	0.00	ROLL	0.0							
AVERAGE MODEL/NOZZLE PARAMETERS..										PTC=	1230.7	TC=	397.3	PTC/PSA=	165.91	PSM(22)/PSA= 0.9155						
HEATER PARAMETERS.....										HEATER TOTAL PRESSURE=				1300.	HEATER TOTAL TEMPERATURE=						465.	

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31 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 822/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.48	818.70	819.7	108.0	111.0	107.5	148.3	182.9	385.4
2	7.50	817.12	818.2	108.4	110.6	109.3	152.2	191.2	386.7
3	7.51	819.75	818.7	106.2	108.8	108.8	152.6	198.1	387.6
4	7.50	825.54	825.5	105.8	108.4	110.1	152.6	204.6	388.4
5	7.49	825.54	824.5	107.1	108.4	111.4	151.7	211.1	389.7
6	7.48	832.91	830.8	105.8	107.5	111.9	152.6	210.3	389.3

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	817.1	385.0	0.0238	6.81	5	0.89267	6	0.98818	11	0.96133	16	1.00883	23	0.90144	29	1.03413	34	0.90351	35	1.14152
2	814.5	387.1	0.0239	6.83	4	0.79612	7	0.95153	12	0.94533	17	1.04756	24	0.99334	30	0.98878	41	0.66550	36	0.99799
3	819.2	387.6	0.0238	6.83	3	0.95514	8	0.99954	13	0.94275	18	1.00728	25	0.91952	31	0.98405	42	0.67015	37	1.02329
4	824.5	389.7	0.0237	6.84	2	1.28866	9	0.97424	14	1.00625	19	1.00780	26	0.99748	32	0.98715	39	0.64072	38	0.93449
5	826.1	390.2	0.0237	6.81	1	1.35638	10	0.96753	15	1.00264	20	0.98818	27	1.01245	33	0.97786	40	0.67866	43	0.67479
6	832.4	390.2	0.0236	6.81									21	0.98044	28	1.03052				

WIND TUNNEL TEST CONDITIONS..... 0 7.465 PT 18.009 PS 7.492 R/L 5.5 MACH 1.193 TEMP 97.2
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 822.3 TC= 388.3 PTC/PSA= 109.76 PSM(221)/PSA= 0.9105
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 980. HEATER TOTAL TEMPERATURE= 450.

A-350

TEST 575 RUN 623/0

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FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.23	890.80	890.8	104.9	113.6	127.9	151.3	195.5	555.3	388.9
2	5.25	875.54	875.5	103.2	111.9	128.8	148.7	201.6	537.5	391.0
3	5.27	851.85	851.9	102.7	111.0	129.2	150.0	209.0	522.4	391.5
4	5.26	848.70	848.2	101.4	109.7	129.2	151.7	213.3	509.8	390.6
5	5.24	843.96	842.4	102.3	109.3	128.8	148.7	218.9	498.1	392.3
6	5.26	847.64	846.1	101.9	108.4	130.1	150.0	222.8	489.0	392.3

[illegible]

WIND TUNNEL TEST CONDITIONS.....										Q	7.755	PT	18.011	PS	5.251	R/L	5.4	MACH	1.453	TEMP	98.6	
MODEL ATTITUDE.....										ALPHA	0.00	BETA	0.00	ROLL	0.0							
AVERAGE MODEL/NOZZLE PARAMETERS,,										PTC=	859.5	TC=	391.3	PTC/PSA=	163.68	PSM1221/PSA= 0.9649						
HEATER PARAMETERS.....										HEATER TOTAL PRESSURE= 1000.					HEATER TOTAL TEMPERATURE= 450.							

TEST 575 RUN 624/0

[illegible]

WIND TUNNEL TEST CONDITIONS.....	Q	7.753	PT	18.011	PS	5.206	R/L	5.4	NACH	1.459	TEMP	98.6
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.80	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1216.7	TC=	380.8	PTC/PSA=	233.71						
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1360.				PSM(221)/PSA= 0.9643							
					HEATER TOTAL TEMPERATURE= 440.							

TEST 575 404 525/6

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.14	1565.54	1562.4	137.4	151.3	157.8	150.0	218.5	513.3	305.4
2	5.13	1561.65	1561.9	135.7	147.0	156.9	150.9	226.3	491.6	395.0
3	5.14	1570.28	1569.2	133.1	144.6	155.2	152.6	230.6	471.2	383.2
4	5.13	1559.75	1559.2	130.9	141.8	154.8	150.0	235.8	456.1	362.6
5	5.14	1565.54	1565.5	129.2	139.2	153.9	148.3	240.2	446.1	383.2
6	5.10	1559.75	1561.3	128.3	137.9	153.5	152.6	244.1	437.8	382.4

[illegible]

WIND TUNNEL TEST CONDITIONS.....	Q	7,746	PT	18,004	PS	5.141	R/L	5.3	MACH	1.467	TEMP	98.8
MODEL ATTITUDE.....	ALPHA	1.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1565.6	TC=	384.0	PTC/PSA=	304.54			PSM[22]/PSA=	0.9791		
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=	1700.			HEATER TOTAL TEMPERATURE=	430.						

TEST 273 400. 026/5

WIND TUNNEL TEST CONDITIONS..... Q 7.744 PT 18.013 PS 5.078 R/L 5.3 MACH 1.476 TEMP 99.3									
MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1921.2 TC= 388.6 PTC/PSA= 378.30 PSH1221/PSA= 0.9862									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 434.									

A-354

T-CT 375 204 627/0

WIND TUNNEL TEST CONDITIONS.....	Q	10.294	PT	90.056	PS	1.215	R/L	10.5	MACH	3.480	TEMP	106.3
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	1803.1	TC=	395.3	PTC/PSA=	1484.28			PSM[22]/PSA=	1.0331		
HEATER PARAMETERS.....	HEATER TOTAL	PRESSURE=		2050.	HEATER TOTAL	TEMPERATURE=		455.				

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30 AUGUST 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 979 RUN 628/3

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FAHRENHEIT---					MODEL-STING FEEDER-PIPE		TCW
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1465.54	1467.1	101.0	103.6	109.3	150.0	167.8	525.0	391.9
2	1.21	1457.64	1459.7	100.6	103.2	108.8	147.6	186.8	505.5	394.9
3	1.21	1472.91	1475.0	100.1	102.3	108.4	151.7	202.9	490.3	395.8
4	1.21	1464.49	1466.1	99.3	101.4	108.4	147.6	216.1	476.2	398.4
5	1.21	1490.80	1491.9	100.6	101.4	108.8	150.4	230.6	470.4	401.0
6	1.21	1482.91	1482.4	99.7	101.4	109.3	148.3	241.5	463.4	402.7

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1462.9	391.5	0.0238	1.21	5	0.82937	6	0.87396	11	0.94085	16	0.98289	23	0.94212	29	0.94148	34	0.95613	35	0.71280
2	1458.7	394.9	0.0238	1.21	4	0.77841	7	0.87906	12	0.99563	17	0.96441	24	0.98416	30	0.94976	41	1.05678	36	0.91282
3	1472.9	396.2	0.0237	1.21	3	1.47146	8	0.92619	13	0.99881	18	0.98671	25	0.98034	31	0.95104	42	1.07461	37	0.98034
4	1464.0	398.0	0.0239	1.21	2	2.59258	9	0.99626	14	0.96378	19	0.99435	26	0.96441	32	0.94530	39	1.12749	38	1.00518
5	1489.7	401.0	0.0236	1.22	1	2.62570	10	0.97397	15	1.01028	20	1.03194	27	0.98671	33	0.94339	40	2.49321	43	1.19137
6	1484.0	401.9	0.0239	1.22							21	0.99308	28	0.97588						

WIND TUNNEL TEST CONDITIONS..... 0 10.291 PT 90.031 PS 1.214 R/L 10.5 MACH 3.480 TEMP 107.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1472.0 TC= 397.2 PTC/PSA= 1212.10 PSM(22)/PSA= 0.9980
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 470.

A-356

30 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RL 029/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1167.12	1169.2	127.0	136.1	147.6	150.4	218.5	446.7	373.7
2	1.21	1165.01	1165.5	125.3	134.0	146.5	152.2	227.6	443.5	375.9
3	1.21	1174.49	1173.4	125.7	133.5	146.1	151.7	237.1	440.9	381.1
4	1.21	1184.49	1184.0	123.6	132.2	144.4	150.9	245.8	437.0	384.5
5	1.21	1197.12	1196.1	123.1	130.9	143.5	150.4	253.6	437.0	388.0
6	1.21	1197.12	1196.6	122.3	129.6	142.6	151.3	261.0	435.7	389.7

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1166.1	373.3	0.0237	1.19	5 0.82870	6 0.87328	11 0.94526	16 0.98412	23 0.94271	29 0.94335	34 0.93869	35 0.71086			
2	1166.6	376.7	0.0238	1.19	4 0.78220	7 0.87774	12 0.99622	17 0.96310	24 0.98348	30 0.95099	41 0.96055	36 0.91150			
3	1176.1	381.5	0.0237	1.19	3 1.44592	8 0.92870	13 0.99813	18 0.98603	25 0.97775	31 0.95036	42 0.96055	37 0.97775			
4	1164.5	385.0	0.0236	1.19	2 2.58290	9 0.99558	14 0.96755	19 0.99176	26 0.96437	32 0.94590	39 1.00131	38 1.00450			
5	1197.1	387.6	0.0235	1.20	1 2.61666	10 0.97392	15 1.00896	20 1.03125	27 0.98348	33 0.94335	40 1.98543	43 0.98539			
6	1197.6	390.6	0.0237	1.20					21 0.99240	28 0.97583					

WIND TUNNEL TEST CONDITIONS..... 0 10.292 PT 90.036 PS 1.215 R/L 10.5 MACH 3.480 TEMP 107.7
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1181.3 TC= 382.4 PTC/PSA= 972.68 PSM(22)/PSA= 0.9840
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300. HEATER TOTAL TEMPERATURE= 475.

A-357

30 AUGUST 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 63670

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH
1	1.21	810.80	811.9	128.3	137.0	149.1	150.0	208.1	388.0
2	1.21	812.38	812.9	127.5	135.7	147.8	150.9	218.5	392.3
3	1.21	809.75	809.7	127.5	135.3	146.5	150.4	228.5	397.5
4	1.21	815.54	820.3	124.9	133.5	145.2	152.6	236.7	401.4
5	1.21	825.54	820.8	125.7	132.2	144.4	148.3	244.9	406.2
6	1.21	828.17	828.2	124.4	130.9	143.5	148.3	253.2	409.7

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA					
1	809.7	387.1	0.0240	1.19	5	0.83124	6	0.87265	11	0.94590	16	0.98348	23	0.94271	29	0.94526	34	0.92870	35	0.70958
2	812.4	392.3	0.0239	1.19	4	0.77774	7	0.87774	12	0.99685	17	0.96118	24	0.98348	30	0.95899	41	0.78474	36	0.91214
3	807.6	397.5	0.0241	1.19	3	1.46248	8	0.92934	13	0.99813	18	0.98539	25	0.97838	31	0.95036	42	0.79494	37	0.97775
4	813.4	401.8	0.0241	1.19	2	2.58099	9	0.99622	14	0.96755	19	0.99112	26	0.96437	32	0.94520	39	0.81532	38	1.00322
5	824.0	406.2	0.0239	1.19	1	2.61348	10	0.97329	15	1.00896	20	1.03861	27	0.98348	33	0.94208	40	1.38859	43	0.82806
6	827.6	409.7	0.0239	1.19									21	0.99240	28	0.97583				

WIND TUNNEL TEST CONDITIONS..... 0 10.292 PT 90.036 PS 1.215 R/L 10.5 MACH 3.4.3 TEMP 107.6
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 815.8 TC= 399.0 PTC/PSA= 671.72 PSM(221)/PSA= .9779
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 900. HEATER TOTAL TEMPERATURE= 515.

A-358

30 AUGUST 1977

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RCL 03170

TEMPERATURE DATA--DEGREES FAHRENHEIT--										
FRA #	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCH	
1	1.21	1606.59	1610.8	97.5	163.2	164.5	150.9	550.3	769.9	550.1
2	1.21	1599.75	1600.3	96.2	161.9	164.5	146.3	553.2	731.3	551.0
3	1.21	1608.17	1604.5	96.2	161.4	165.3	148.7	550.6	701.4	551.9
4	1.21	1613.43	1610.3	97.1	161.4	167.1	151.3	548.4	678.9	553.2
5	1.21	1632.91	1634.5	97.1	161.4	168.8	152.2	546.2	660.7	553.6
6	1.21	1638.70	1639.7	97.5	161.9	161.0	152.6	543.6	647.7	553.6

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	1601.3	550.1	0.0244	1.24	5	0.83136	6	0.87149	11	0.94221	16	0.98234	23	0.94030	29	0.92628	34	0.99381	35	1.84046
2	1601.9	551.4	0.0244	1.25	4	0.78294	7	0.88041	12	0.99636	17	0.96833	24	0.98425	30	0.94667	41	1.18365	36	0.90462
3	1617.1	552.3	0.0243	1.25	3	1.48243	8	0.92819	13	0.99827	18	0.98807	25	0.98107	31	0.94985	42	1.18174	37	0.97724
4	1618.2	553.2	0.0244	1.26	2	2.61894	9	1.00018	14	0.96387	19	0.99636	26	0.96705	32	0.94348	39	1.25118	38	1.01674
5	1635.0	553.6	0.0243	1.27	1	2.64442	10	0.97788	15	1.01165	20	1.03458	27	0.98935	33	0.94284	40	2.81961	43	1.21935
6	1639.7	554.9	0.0243	1.27									21	0.99062	28	0.98234				

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.023 PS 1.214 R/L 10.4 MACH 3.480 TEMP 108.7
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1618.9 TC= 552.6 PTC/PSA= 1333.13 PSM(22)/PSA= 1.0346
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1900. HEATER TOTAL TEMPERATURE= 630.

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31 AUGUST 1973

ASFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 032/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	5.15	1133.43	1132.9	90.2	91.9	94.1	151.3	421.4	522.8
2	5.18	1115.01	1115.0	89.3	91.5	94.9	148.3	417.5	525.0
3	5.18	1120.90	1119.2	89.7	91.8	95.4	150.4	413.6	526.3
4	5.18	1119.22	1121.3	90.6	91.9	97.1	152.2	411.0	527.1
5	5.21	1113.96	1113.4	91.5	92.3	98.4	152.6	408.8	527.6
6	5.19	1120.80	1120.3	92.8	92.8	100.1	147.8	406.2	528.4

FR	PTC	TC	P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1133.4	523.7	0.0245	5.02	5 0.88193	6 0.98728	11 0.96841	16 0.93710	23 0.95723	29 0.91772	34 0.98332	35 0.97438		
2	1116.1	526.3	0.0246	5.01	4 0.79918	7 0.94679	12 0.93486	17 0.94306	24 1.01538	30 0.99450	41 0.82453	36 1.13019		
3	1120.8	526.7	0.0244	5.00	3 1.03923	8 0.99972	13 0.95574	18 0.94754	25 0.93263	31 1.01612	42 0.82006	37 1.07949		
4	1118.2	527.6	0.0244	5.00	2 1.37546	9 0.99823	14 0.94903	19 0.97363	26 0.90877	32 1.01165	39 0.79918	38 1.08844		
5	1114.0	528.0	0.0245	5.00	1 1.43808	10 0.99898	15 0.95052	20 0.97959	27 0.94530	33 1.01538	40 0.85882	43 0.81857		
6	1121.9	528.9	0.0244	4.99				21 1.01314	28 0.94530					

WIND TUNNEL TEST CONDITIONS..... Q 7.752 PT 18.011 PS 5.188 R/L 5.4 MACH 1.461 TEMP 99.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC=1120.7 TC= 526.9 PTC/PSA= .216.00 RSM(22)/PSA= 0.9646
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1300, HEATER TOTAL TEMPERATURE= 625.

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31 AUGUST 1973

USFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NO-GLUCESCENT PHASE

TEST 575 RUN 03370

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	7.47	1553.43	1584.0	107.5	108.0	113.2	147.8	355.9	570.1
2	7.47	1596.59	1594.0	108.8	109.3	115.8	151.3	362.4	569.2
3	7.48	1599.22	1603.4	108.4	108.4	118.4	147.8	369.8	569.2
4	7.50	1609.22	1613.4	108.4	108.4	120.5	148.3	373.7	568.8
5	7.49	1631.85	1628.7	110.6	110.1	124.4	150.9	378.9	569.2
6	7.50	1625.01	1623.4	111.9	109.7	126.6	150.9	381.5	567.5

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1583.4	570.1	0.0247	6.95	5	0.89496	6	0.99934	11	0.97351	16	1.00709	23	0.91460	29	1.04068	34	0.92493	35	1.13782
2	1600.3	570.1	0.0245	6.95	4	0.79524	7	0.97506	12	0.96317	17	1.06135	24	1.00563	30	1.00709	41	0.82986	36	1.00606
3	1597.6	569.2	0.0246	6.95	3	0.97144	8	1.00141	13	0.94509	18	1.00761	25	0.93372	31	0.99366	42	0.83089	37	1.03551
4	1606.1	568.8	0.0246	6.96	2	1.30369	9	0.98384	14	1.02569	19	1.01588	26	1.01071	32	1.00089	39	0.81901	38	0.95800
5	1634.0	569.2	0.0243	6.97	1	1.37087	10	0.98642	15	1.01639	20	0.98436	27	1.02311	33	0.99004	40	0.89031	43	0.84432
6	1630.3	567.0	0.0245	6.95									21	0.98304	28	1.03758				

WIND TUNNEL TEST CONDITIONS..... Q 7.460 PT 17.996 PS 7.486 R/L 5.3 MACH 1.193 TEMP 109.8
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1608.6 TC= 569.1 PTC/PSA= 214.89 PSM(22)/PSA= 0.9292
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1700. HEATER TOTAL TEMPERATURE= 645.

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31 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUA 634/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	10.62	1600.80	1600.8	148.7	161.7	170.4	151.3	291.8	571.4
2	10.62	1595.54	1598.7	148.3	160.4	168.2	152.6	303.9	570.9
3	10.63	1610.80	1610.8	146.1	157.6	167.3	151.7	314.3	570.5
4	10.63	1619.22	1619.7	146.5	156.1	166.0	146.3	323.4	571.4
5	10.59	1628.70	1630.3	144.8	154.3	165.6	150.4	329.9	569.6
6	10.59	1600.80	1601.3	144.4	153.5	165.2	152.6	337.3	569.2

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1602.9	571.4	0.0245	9.84	5	1.00042	6	0.98366	11	0.96106	16	0.98402	23	0.96252	29	1.01354	34	0.92899	35	1.03832
2	1596.6	572.2	0.0246	9.84	4	0.95559	7	0.96871	12	0.96835	17	1.01536	24	0.96944	30	0.99896	41	0.90894	36	1.03031
3	1613.4	570.5	0.0245	9.84	3	0.89436	8	0.99131	13	0.97710	18	0.99350	25	0.96069	31	0.99495	42	0.90858	37	1.02557
4	1619.7	571.8	0.0245	9.86	2	1.09408	9	0.98402	14	0.97965	19	0.99240	26	0.97819	32	0.98366	39	0.89509	38	0.95195
5	1623.4	569.6	0.0244	9.82	1	1.15167	10	0.96580	15	0.98694	20	0.97782	27	0.99167	33	0.96871	40	0.92316	43	0.91878
6	1605.5	570.5	0.0248	9.83									21	0.96653	28	0.99495				

WIND TUNNEL TEST CONDITIONS..... 0 6.047 PT 17.996 PS 10.613 R/L 5.0 MACH 0.902 TEMP 109.6
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1610.3 TC= 571.0 PTC/PSA= 151.72 PSM(22)/PSA= 0.9269
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1700. HEATER TOTAL TEMPERATURE= 645,

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31 AUGUST 1973

NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 63570

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	10.58	8.70	8.7	106.2	111.0	113.6	150.0	123.1	652.9	139.2
2	10.59	8.70	8.7	106.2	110.1	112.3	151.3	122.7	653.3	137.9
3	10.57	9.22	8.7	105.3	109.3	111.4	152.2	122.7	653.3	136.6
4	10.59	9.22	8.7	104.5	108.8	110.1	151.7	121.4	652.9	136.1
5	10.58	9.22	8.2	104.9	107.5	109.3	148.7	121.0	653.3	136.1
6	10.57	9.22	8.7	105.3	107.1	108.8	153.0	120.1	652.9	134.8

FR	PTC	JC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	9.2	140.5	1.0372	9.98	5	0.99438	6	0.97948	11	0.95389	16	0.97729	23	0.95755	29	1.00873	34	0.93122	35	1.04639
2	9.2	139.2	1.0361	9.96	4	0.95823	7	0.96157	12	0.96818	17	1.02807	24	0.96340	30	0.99082	41	0.98782	36	1.02994
3	9.7	138.3	0.9771	9.94	3	0.88296	8	0.98424	13	0.96669	18	0.98716	25	0.94877	31	0.98679	42	0.98307	37	1.01458
4	9.2	137.4	1.0361	9.96	2	1.08478	9	0.97656	14	0.96961	19	0.98497	26	0.96925	32	0.97583	39	0.91294	38	0.94256
5	9.7	138.3	0.9761	9.95	1	1.14986	10	0.96266	15	0.98168	20	0.97692	27	0.98862	33	0.96486	40	0.98563	43	0.98197
6	10.3	137.0	0.9300	9.95								21	0.96632	28	0.99191					

WIND TUNNEL TEST CONDITIONS..... Q 6.073 PT 10.084 PS 10.579 R/L 5.2 MACH 0.906 TEMP 96.9
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 9.6 TC= 130.4 PTC/PSA= 0.90 PSM(22)/PSA= 0.9412
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

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A-363

31 AUGUST 1973

WIND TUNNEL TEST...NON-QUIESCENT PHASE

TEST 575 407 636/0

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TCM
1	7.42	5.01	4.5	124.4	134.5	135.7	148.7	159.5	192.0
2	7.43	5.01	5.0	122.3	132.2	132.7	151.4	158.2	189.4
3	7.43	5.01	5.0	122.3	130.9	131.8	152.2	156.5	188.1
4	7.43	5.01	5.0	121.5	129.2	129.2	152.2	155.6	185.4
5	7.44	5.54	5.0	118.8	126.6	127.5	151.3	154.8	185.1
6	7.43	5.01	5.0	116.2	124.4	124.9	147.6	152.6	184.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	6.1	192.9	0.9853	6.78	5	0.89676	6	0.98992	11	0.96337	16	1.00970	23	0.91081	29	1.03624	34	0.90873	35	1.14345
2	5.5	189.9	1.0717	6.78	4	0.78121	7	0.96546	12	0.95765	17	1.05654	24	0.99877	30	1.00033	41	0.75259	36	0.99356
3	6.6	189.4	0.8945	6.78	3	0.95401	8	0.99304	13	0.93839	18	1.00761	25	0.92070	31	0.97795	42	0.74894	37	1.02427
4	6.6	187.7	0.8930	6.79	2	1.29439	9	0.98107	14	0.99981	19	1.00865	26	1.00085	32	0.98836	39	0.74530	38	0.93475
5	5.5	186.0	1.0699	6.78	1	1.35008	10	0.96806	15	1.00137	20	0.99512	27	1.01230	33	0.98263	40	0.77497	43	0.80411
6	5.5	184.2	1.0627	6.78																
											</									

WIND TUNNEL TEST CONDITIONS..... Q 7.483 PT 18.011 PS 7.432 R/L 5.5 MACH 1.199 TEMP 97.2
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 6.0 TC= 188.4 PTC/PSA= 0.80 PSM(22)/PSA= 0.9126
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

A-364

31 AUGUST 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 FLUJE TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 40, 63770

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	5.22	2.38	2.9	94.1	95.4	95.7	147.8	106.8	522.0	111.4
2	5.20	2.91	2.9	95.6	95.4	96.2	152.2	108.0	524.1	110.1
3	5.23	2.91	2.9	93.2	94.1	95.4	150.4	107.5	524.1	109.7
4	5.24	2.38	2.4	93.6	93.6	94.9	148.3	107.5	525.4	110.1
5	5.25	2.91	2.4	93.6	93.6	94.9	150.4	106.7	526.7	110.1
6	5.25	2.91	2.9	91.9	92.8	94.1	152.2	106.2	527.1	108.4

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	2.9	112.7	1.3024	5.10	5	0.88027	6	0.90019	11	0.93856	16	0.94151	23	0.92601	29	0.96438	34	0.97766	35	0.99094
2	2.9	112.7	1.3058	5.12	4	0.78361	7	0.92527	12	0.94298	17	0.94298	24	1.00791	30	0.99390	41	0.71498	36	1.13335
3	3.4	111.4	1.1056	5.10	3	1.02489	8	1.04112	13	0.96217	18	0.95626	25	0.92380	31	1.00718	42	0.70834	37	1.04997
4	3.4	112.3	1.1115	5.10	2	1.38201	9	1.00644	14	0.92749	19	0.96955	26	0.90683	32	1.00718	39	0.70687	38	1.07432
5	3.4	111.9	1.0996	5.11	1	1.43735	10	0.99832	15	0.93782	20	1.01677	27	0.93413	33	1.01529	40	0.71941	43	0.75926
6	3.4	110.6	1.1027	5.11									21	1.00127	28	0.93265				

WIND TUNNEL TEST CONDITIONS..... 0 7.754 PT 18.009 PS 5.242 R/L 5.4 MACH 1.454 TEMP 98.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 3.3 TC= 111.9 PTC/PSA= 0.62 PSM(22)/PSA= 0.9741
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 0.

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OF POOR QUALITY

A-365

30 AUGUST 1973

SFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 636/C

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	14.49	12.9	124.0	130.1	123.6	150.9	200.7	304.3
2	1.21	14.49	12.9	123.1	127.9	121.8	150.0	199.9	305.2
3	1.21	14.49	13.4	122.3	127.5	121.4	151.3	199.9	305.2
4	1.21	14.49	12.9	121.0	125.7	119.7	147.8	198.6	305.6
5	1.21	14.49	14.5	120.1	125.3	119.2	152.2	199.0	305.6
6	1.21	12.91	14.5	117.9	122.7	117.9	147.8	197.7	306.1

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	13.4	304.8	0.0242	1.19	5 0.82694	6 0.87026	11 0.94671	16 0.98048	23 0.94161	29 0.94671	34 0.92696	35 0.70908			
2	14.0	305.2	0.0240	1.19	4 0.77470	7 0.87918	12 0.99513	17 0.94098	24 0.97856	30 0.94990	41 0.26821	36 0.91486			
3	13.4	305.2	0.0257	1.19	3 1.45702	8 0.92760	13 0.99258	18 0.98048	25 0.97347	31 0.94862	42 0.19686	37 0.97347			
4	14.0	306.1	0.0255	1.19	2 2.56363	9 0.99577	14 0.96327	19 0.98748	26 0.95945	32 0.94798	39 0.18539	38 0.98939			
5	14.0	306.1	0.0255	1.19	1 2.60377	10 0.97474	15 1.00660	20 1.02125	27 0.97920	33 0.94544	40 0.25611	43 0.24592			
6	14.5	306.9	0.0232	1.19				21 0.99258	28 0.97028						

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.019 PS 1.214 R/L 10.5 MACH 3.480 TEMP 107.1
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 13.9 TC= 305.7 PTC/PSA= 11.42 PSM(22)/PSA= 0.9791
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 0. HEATER TOTAL TEMPERATURE= 560.

A-366

11 SEPTEMBER 1973

SFC TRANSONIC WIND TUNNEL, HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 41. 701/1

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	954.90	937.0	67.6	66.1	66.8	152.6	67.6	63.2
2	1.21	956.58	942.3	67.6	67.2	66.8	148.3	67.6	70.2
3	1.21	967.53	949.6	65.9	66.3	66.8	152.2	66.3	61.6
4	1.21	972.79	954.4	67.2	66.0	66.8	140.7	64.2	52.7
5	1.21	978.58	961.2	65.5	66.8	66.3	150.0	62.4	44.7
6	1.21	978.05	960.2	65.9	66.3	65.9	148.7	59.0	36.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	950.7	69.4 0.0194	1.27	5 0.82615	6 0.86691	11 0.93762	16 0.96755	23 0.94208	29 0.94399	34 1.02106	35 0.70803				
2	959.6	59.4 0.0193	1.28	4 0.77455	7 0.88539	12 0.99494	17 0.94271	24 0.98029	30 0.94653	41 1.31852	36 0.90322				
3	969.1	53.3 0.0192	1.29	3 1.46312	8 0.92106	13 0.99622	18 0.97265	25 0.96310	31 0.94144	42 3.82117	37 3.62117				
4	973.3	49.9 0.0192	1.29	2 2.51602	9 0.99749	14 0.94653	19 0.96819	26 0.92806	32 0.94144	39 1.36120	38 1.00131				
5	980.2	40.3 0.0190	1.30	1 2.55106	10 0.96692	15 1.00450	20 0.97010	27 0.97966	33 0.90768	40 3.82117	43 1.34092				
6	979.6	35.6 0.0191	1.30				21 0.96116	28 0.96819							

WIND TUNNEL TEST CONDITIONS..... 0 10.292 PT 90.036 PS 1.215 R/L 10.6 MACH 3.480 TEMP 182.9
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 968.8 TC= 51.3 PTC/PSA= 797.66 PSM(22)/PSA= 1.0609
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 0.

A-367

10 SEPTEMBER 1973

USFC TRIANGULAR WIND TUNNEL MONTGOMERY, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RLV 702/9

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	435.46	429.7	109.3	113.2	117.9	152.2	142.2	255.8
2	1.21	434.93	427.0	106.7	111.4	115.8	152.2	147.8	266.2
3	1.21	440.20	431.3	106.7	111.0	115.3	150.9	155.6	276.1
4	1.21	442.63	436.5	104.9	109.3	114.0	152.2	160.8	282.7
5	1.21	443.36	436.0	104.0	108.4	113.6	152.2	166.9	290.0
6	1.21	451.78	442.3	103.2	107.5	111.9	152.6	172.5	296.5

FR	PTC	TC P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	433.9	256.2	0.0324	1.18	5	0.83068	6	0.87782	11	0.95108	16	0.97593	23	0.94853	29	0.95681	34	0.93261	35	0.72494
2	434.4	266.6	0.0324	1.18	4	0.78163	7	0.89630	12	1.00459	17	0.95236	24	0.98675	30	0.96000	41	0.87655	36	0.91923
3	439.7	276.6	0.0320	1.18	3	1.44095	8	0.93516	13	1.00587	18	0.97720	25	0.97147	31	0.95427	42	3.82152	37	0.98421
4	441.3	282.7	0.0320	1.18	2	2.47867	9	1.00969	14	0.96318	19	0.97401	26	0.93961	32	0.94662	39	0.92815	38	1.01160
5	442.3	290.0	0.0320	1.18	1	2.50670	10	0.97847	15	1.01415	20	0.97720	27	0.98994	33	0.93643	40	3.82152	43	0.88165
6	451.8	296.5	0.0314	1.18								21	0.97210	28	0.98102					

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.027 PS 1.214 R/L 10.4 MACH 3.488 TEMP 109.0
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 440.5 TC= 278.1 PTC/PSA= 362.77 PSH(22)/PSA= 0.9681
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 680. HEATER TOTAL TEMPERATURE= 480.

A-368

17 SEPT-SEP 1973

USFC TRISOLIC WIND TUNNEL - MTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RC 72370

FRAME	PSA	PTC	SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)	MODEL-STING FEEDER-PIPE	TC
1	1.21	837.30	813.9	101.0	104.0	108.4	150.4	141.5 306.1	258.4
2	1.22	841.25	822.3	101.4	104.0	108.4	152.2	151.3 304.0	266.6
3	1.21	844.41	827.6	100.1	103.6	107.5	150.9	159.1 304.8	273.5
4	1.21	864.41	847.0	98.8	102.7	106.7	150.4	166.9 305.0	278.7
5	1.21	866.51	846.5	97.5	101.4	105.8	152.2	173.8 306.5	282.2
6	1.21	877.57	860.2	98.8	101.0	104.9	152.2	180.3 308.7	287.0

FR	PTC	TC	P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	833.4	258.4	0.0211	1.22	5 0.83308	6 0.88085	11 0.94963	16 0.97574	23 0.94899	29 0.95218	34 0.98530	35 0.71907			
2	842.3	267.0	0.0209	1.23	4 0.78276	7 0.89677	12 1.00377	17 0.95154	24 0.98912	30 0.95536	41 1.17064	36 0.91842			
3	846.0	274.0	0.0209	1.23	3 1.45152	6 0.93435	13 1.00568	18 0.97702	25 0.97320	31 0.95091	42 3.82082	37 0.98339			
4	863.4	278.7	0.0206	1.23	2 2.50369	9 1.00886	14 0.96173	19 0.97320	26 0.93944	32 0.95027	39 1.20439	38 1.01523			
5	866.0	282.2	0.0206	1.23	1 2.54509	10 0.97893	15 1.01460	20 0.97829	27 0.99039	33 0.92799	40 3.82082	43 1.17764			
6	877.6	287.9	0.0204	1.24				21 0.97129	28 0.98145						

WIND TUNNEL TEST CONDITIONS..... Q 10.293 PT 90.044 PS 1.215 R/L 10.4 MACH 3.480 TEMP 108.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 854.8 TC= 274.7 PTC/PSA= 703.73 PSM(22)/PSA= 1.0122
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 330.

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OF POOR QUALITY

A-369

13 SEPTEMBER 1973

MSED TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NOY-QUIESCENT PHASE

TEST 575 RUN 704/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--				MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)		
1	1.21	1224.94	1190.6	100.6	104.0	107.5	151.3	225.4
2	1.21	1235.46	1204.4	98.9	102.7	105.8	148.3	227.6
3	1.23	1245.99	1219.7	98.8	101.4	105.3	150.0	230.6
4	1.22	1247.04	1210.6	98.0	101.0	104.5	152.6	231.9
5	1.21	1251.78	1224.4	97.1	101.0	104.0	150.0	234.1
6	1.21	1252.83	1222.8	96.2	98.8	104.0	151.7	235.4

FR	PTC	TC	P47	PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	
1	1231.3	225.4	0.0169	1.32	5	0.83379	6	0.88086	11	0.94827	16	0.97371	23	0.94763	29	0.94763	34	1.08565	35	0.71168
2	1237.6	228.5	0.0168	1.32	4	0.78418	7	0.89675	12	1.00233	17	0.94891	24	0.98707	30	0.95145	41	1.37884	36	0.91456
3	1245.5	231.1	0.0167	1.33	3	1.45262	8	0.93491	13	1.00551	18	0.97562	25	0.97244	31	0.94763	42	3.81534	37	0.98071
4	1243.4	232.8	0.0168	1.33	2	2.50137	9	1.00996	14	0.96035	19	0.97180	26	0.93746	32	0.95717	39	1.40110	38	1.01950
5	1251.3	234.5	0.0167	1.33	1	2.54081	10	0.97943	15	1.01378	20	0.97625	27	0.98897	33	0.91520	40	3.81534	43	1.37312
6	1259.1	235.8	0.0167	1.34									21	0.96862	28	0.97689				

WIND TUNNEL TEST CONDITIONS..... Q 10.307 PT 90.173 PS 1.216 R/L 10.5 MACH 3.480 TEMP 108.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1244.7 TC= 231.4 PTC/PSA= 1023.20 PSM(22)/PSA= 1.0931
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 260.

A-370

10 SEPTEMBER 1973

 *SFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 70570

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FARRENHEIT--					MODEL-STING FEEDER-PIPE	TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	1580.72	1547.6	81.1	81.5	81.9	150.9	105.3	226.3
2	1.22	1598.89	1561.6	81.9	81.5	81.9	147.8	117.9	229.3
3	1.21	1604.94	1561.3	81.9	81.5	81.9	150.4	127.9	232.4
4	1.21	1589.67	1557.0	80.2	81.1	82.4	148.7	136.1	234.1
5	1.21	1535.46	1504.9	81.5	81.1	82.4	153.0	143.5	231.9
6	1.21	1468.62	1442.3	81.1	80.6	82.8	152.6	150.4	231.1

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	1579.7	226.3	0.0149	4.64	5	0.83698	6	0.88539	11	0.94781	16	0.97711	23	0.94972	29	0.94526	34	1.18158	35	0.70767
2	1599.7	228.9	0.0147	4.64	4	0.78857	7	0.90067	12	1.00577	17	0.95418	24	0.99049	30	0.95227	41	1.53318	36	0.91787
3	1611.8	232.8	0.0146	4.64	3	1.45993	8	0.93571	13	1.00896	18	0.97966	25	0.97838	31	0.94845	42	3.82117	37	0.98348
4	1587.0	235.4	0.0148	4.64	2	2.52112	9	1.01405	14	0.96310	19	0.97583	26	0.94144	32	0.96755	39	1.55420	38	1.04208
5	1531.3	233.7	0.0151	4.64	1	2.55488	10	0.97966	15	1.01724	20	0.97966	27	0.99112	33	0.91023	40	3.82117	43	1.50770
6	1458.1	232.4	0.0155	4.64								21	0.97201	28	0.97966					

WIND TUNNEL TEST CONDITIONS..... Q 10.292 PT 90.036 PS 1.215 R/L 10.4 MACH 3.480 TEMP 108.6
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1561.3 TC= 231.6 PTC/PSA= 1285.51 PSM(22)/PSA= 3.8212
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 260.

A-371

10 SEPTEMBER 1973

-SFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 706/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TC
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)		
1	1.21	1576.51	1544.9	113.6	117.9	126.1	151.3	181.6	390.6
2	1.21	1587.57	1546.5	111.9	117.1	118.8	152.6	202.0	404.0
3	1.21	1608.09	1573.4	111.9	116.2	119.2	152.6	220.2	411.0
4	1.21	1552.30	1512.8	112.3	115.3	118.8	147.8	236.3	407.5
5	1.21	1501.78	1460.2	111.4	114.0	119.7	152.6	250.1	412.7
6	1.21	1440.72	1397.6	111.0	113.6	121.5	151.3	262.3	406.6

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA				
1	1573.4	389.7	0.0150	1.44	5	0.84533	6	0.87591	11	0.94853	16	0.97720	23	0.95172	29	0.94535	34	1.22309	35	0.71092
2	1591.8	402.3	0.0149	1.51	4	0.80202	7	0.89439	12	1.00459	17	0.96255	24	0.99567	30	0.95363	41	1.65117	36	0.91732
3	1603.9	410.5	0.0148	1.54	3	1.48364	8	0.93261	13	1.00778	18	0.98038	25	0.97720	31	0.94981	42	3.82152	37	1.05301
4	1558.1	410.5	0.0151	1.53	2	2.56276	9	1.00714	14	0.96510	19	0.97593	26	0.94089	32	0.96828	39	1.67028	38	1.11097
5	1514.9	413.1	0.0153	1.52	1	2.59525	10	0.97847	15	1.01797	20	0.98230	27	0.99249	33	0.92050	40	3.82152	43	1.53715
6	1449.1	406.6	0.0156	1.49								21	0.97083	28	0.98102					

WIND TUNNEL TEST CONDITIONS..... C 10.291 PT 90.027 PS 1.214 R/L 10.4 MACH 3.480 TEMP 109.8
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1548.5 TC= 405.5 PTC/PSA= 1275.15 PSM(22)/PSA= 1.2409
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 480.

A=372

TEST 572 RUN 757/3

ORIGINAL

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1218.09	1196.5	112.3	119.7	143.5	147.6	176.4	497.2	376.3
2	1.21	1235.99	1210.7	112.3	118.6	142.2	148.3	195.1	479.5	367.6
3	1.21	1230.72	1204.4	110.6	117.1	140.5	148.7	212.0	466.5	392.8
4	1.21	1257.04	1227.0	111.4	116.2	139.2	148.3	227.2	465.8	403.1
5	1.21	1258.09	1230.7	109.3	115.3	138.3	148.3	240.2	454.6	431.4
6	1.21	1282.30	1259.1	109.7	114.5	137.9	149.1	251.9	452.6	404.0

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A-373

WIND TUNNEL TEST CONDITIONS..... Q 10,290 PT 90.019 PS 1.214 R/L 10.4 MACH 3.480 TEMP 110.5									
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1248.8 TC= 394.8 PTC/PSA= 1028.42 PSM[22]/PSA= 1.1200									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600, HEATER TOTAL TEMPERATURE= 470,									

17 SEPTEMBER 1973

FPC TRISONIC WIND TUNNEL - MONTGOMERY, ALABAMA
PLUVE TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 708/0

FRAME	-S-	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	711.00	659.7	147.2	141.7	170.2	140.3	227.7	510.2	357.2
2	1.21	707.34	653.9	147.4	159.1	168.2	148.3	217.6	495.5	371.1
3	1.21	719.57	705.5	146.1	157.4	166.0	146.7	227.2	482.9	361.1
4	1.22	731.25	716.0	144.4	155.0	163.9	152.6	236.3	473.4	389.7
5	1.21	737.04	724.4	140.9	152.0	161.7	148.7	244.9	466.9	389.7
6	1.21	746.51	730.2	140.0	150.4	160.4	151.7	254.0	462.6	395.8

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	701.8	357.6	0.0234	1.21	5 0.83586	6 0.88364	11 0.96009	16 0.98048	23 0.95244	29 0.95690	34 0.96837	35 0.71863			
2	710.2	370.7	0.0232	1.21	4 0.79126	7 0.89319	12 1.00660	17 0.95372	24 0.99258	30 0.95754	41 1.09579	36 0.91804			
3	720.7	380.6	0.0230	1.21	3 1.46657	8 0.93976	13 1.01106	18 0.98048	25 0.97665	31 0.95435	42 3.82188	37 3.82188			
4	728.1	390.2	0.0229	1.21	2 2.53051	9 1.90851	14 0.96901	19 0.97856	26 0.94416	32 0.95244	39 1.14548	38 1.04737			
5	736.0	390.2	0.0227	1.21	1 2.56554	10 0.98239	15 1.01679	20 0.98239	27 0.99322	33 0.93652	40 3.92188	43 1.11108			
6	748.6	396.7	0.0224	1.22				21 0.97729	28 0.98430						

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.019 PS 1.214 R/L 10.4 MACH 3.480 TEMP 110.4
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 724.2 TC= 381.0 PTC/PSA= 596.43 PSM(22)/PSA= 0.9969
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 490.

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45-75 96, 729/3

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WIND TUNNEL TEST CONDITIONS.....	Q	10,288	PT	90.002	PS	1.214	R/L	10.4	MACH	3.480	TEMP	110.3
MODEL ATTITUDE.....	ALPHA	0.00	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC=	433.8	TC=	357.4	PTC/PSA=	357.31	PSM[22]/PSA= 0.9709					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE=				600.	HEATER TOTAL TEMPERATURE= 490.						

11 SEPTEMBER 1973

USFC TRISONIC WIND TUNNEL MONTSVILLE, ALABAMA
 PLUVE TECHNOLOGY TEST...VCN-QUIESCIENT PHASE

TEST 575 RUN 71070

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					CDEL-STING FEEDER-PIPE	TC	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	817.53	806.2	156.5	166.0	176.9	150.4	243.2	770.5	502.4
2	1.21	824.37	811.7	155.6	166.0	175.1	146.3	263.6	730.9	516.7
3	1.21	847.53	832.6	152.6	163.4	174.3	147.8	281.8	704.9	521.9
4	1.21	856.48	836.5	151.7	161.3	171.7	146.3	298.7	681.9	530.2
5	1.21	854.90	837.5	150.9	159.5	172.5	147.3	313.4	664.6	532.8
6	1.21	872.79	846.5	150.0	157.8	172.1	150.9	327.3	652.4	538.6

FR	PTC	TC	P47/PTC	PORT-22	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA	NO	PSM/PSA
1	818.1	502.9	0.0213	1.31	5	0.83327	6	0.86194	11	0.94921	16	0.97470	23	0.94539	29	0.94157	34	0.99636	35	0.69248
2	822.8	510.0	0.0213	1.31	4	0.78931	7	0.87914	12	0.99508	17	0.95750	24	0.98807	30	0.94539	41	1.19384	36	0.89185
3	847.5	523.7	0.0207	1.32	3	1.48562	8	0.92437	13	1.00082	18	0.97151	25	0.96960	31	0.93966	42	3.82170	37	2.82917
4	856.5	532.8	0.0207	1.33	2	2.56989	9	0.99508	14	0.96196	19	0.97024	26	0.94030	32	0.94030	39	1.36266	38	1.03012
5	854.9	533.6	0.0208	1.34	1	2.60429	10	0.97087	15	1.00973	20	0.97342	27	0.98999	33	0.92116	40	3.82170	43	1.28013
6	870.2	539.3	0.0205	1.35									21	0.96514	28	0.98107				

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.023 PS 1.214 R/L 10.6 MACH 3.480 TEMP 101.5
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.06 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 845.0 TC= 525.0 PTC/PSA= 695.84 PSM(22)/PSA= 1.0929
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1100. HEATER TOTAL TEMPERATURE= 635.

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11 SEPTEMBER 1973

 MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 711/0

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1589.63	1558.6	60.3	61.1	61.1	152.2	155.2	645.9	508.1
2	1.21	1589.63	1555.4	62.0	61.6	62.4	147.8	192.0	629.9	522.4
3	1.21	1602.79	1562.3	62.9	62.4	64.6	152.6	223.3	621.6	534.5
4	1.21	1563.84	1524.4	64.2	63.3	67.6	148.3	251.0	616.9	537.5
5	1.21	1521.21	1485.4	67.2	65.0	72.0	152.2	274.8	613.8	539.3
6	1.21	1465.42	1438.6	68.1	65.0	76.7	152.6	295.7	608.2	536.2

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	
1	1588.6	508.1	0.0148	1.41	5	0.84541	6	0.85752	11	0.93333	16	0.97283	23	0.94607	29	0.92823	34	1.19708	35	0.68742
2	1588.7	521.9	0.0150	1.66	4	0.88337	7	0.88236	12	0.99959	17	0.96073	24	0.99322	30	0.94416	41	1.50989	36	0.89383
3	1606.5	534.5	0.0149	1.70	3	1.51754	8	0.92123	13	1.08787	18	0.98048	25	0.97920	31	0.94352	42	3.82188	37	3.82188
4	1567.0	538.4	0.0156	1.70	2	2.61842	9	1.88214	14	0.95754	19	0.97793	26	0.94352	32	0.95627	39	1.76536	38	1.11745
5	1520.2	539.3	0.0152	1.60	1	2.63690	10	0.97474	15	1.82061	20	0.98557	27	1.08022	33	0.92377	40	3.82188	43	1.62457
6	1459.1	536.7	0.0156	1.58									21	0.97092	28	0.99067				

WIND TUNNEL TEST CONDITIONS..... Q 10.290 PT 90.019 PS 1.214 R/L 10.6 MACH 3.480 TEMP 102.3
 MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1553.7 TC= 529.8 PTC/PSA= 1279.50 PSH(22)/PSA= 1.3238
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 640.

A-377

TEST 575 RUN 71270

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT					MODEL-STING FEEDER-PIPE	TCH	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	527.00	516.5	65.0	65.5	65.9	152.6	67.2	169.1	93.6
2	1.21	527.00	519.6	65.0	65.0	64.6	150.9	68.9	146.1	86.3
3	1.21	530.69	520.7	65.0	65.5	65.9	153.0	70.2	170.4	85.8
4	1.21	532.26	523.3	65.5	65.0	65.0	150.4	70.7	131.4	76.3
5	1.21	536.48	526.5	67.2	65.9	65.9	151.3	72.4	161.3	77.2
6	1.21	534.90	525.4	66.3	65.5	65.5	150.4	71.5	155.6	72.8

[illegible]

WIND TUNNEL TEST CONDITIONS..... Q 10.291 PT 90.031 PS 1.214 R/L 10.6 MACH 3.480 TEMP 103.4									
MODEL ATTITUDE..... ALPHA 0.02 BETA 0.00 ROLL 0.0									
AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 530.9 TC= 83.4 PTC/PSA= 437.12 PSN(22)/PSA= 0.9786									
HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 600. HEATER TOTAL TEMPERATURE= 0.									

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11 SEPTEMBER 1973

MSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 71370

FRAME	PSA	PTC	TEMPERATURE DATA--DEGREES FAHRENHEIT--					MODEL-STING FEEDER-PIPE	TCM	
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1360.16	1328.1	63.3	62.4	61.6	150.9	59.8	51.2	52.5
2	1.21	1365.95	1333.8	63.3	63.3	61.6	148.3	59.4	47.7	48.1
3	1.23	1372.26	1340.7	63.3	63.3	62.4	150.4	58.5	42.5	45.1
4	1.21	1372.26	1348.6	62.9	63.3	61.6	147.8	55.9	36.9	34.7
5	1.21	1381.74	1351.2	63.3	62.0	61.6	148.7	53.8	33.0	35.1
6	1.21	1372.26	1342.3	63.3	62.0	61.6	148.3	50.7	28.6	32.5

FR	PTC	IC P47/PTC	PORT-22 NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO	PSM/PSA NO
1	1360.2	53.3 0.0159	1.44	5 0.82031	6 0.86860	11 0.93532	16 0.96455	23 0.93977	29 0.94041	34 1.20156	35 0.69133				
2	1366.5	48.1 0.0159	1.46	4 0.77647	7 0.89884	12 0.99759	17 0.94041	24 0.98171	30 0.94549	41 1.61457	36 0.90101				
3	1372.8	46.4 0.0159	1.49	3 1.46907	8 0.92516	13 1.08013	18 0.97345	25 0.96646	31 0.94168	42 3.81182	37 3.81182				
4	1373.3	37.3 0.0159	1.51	2 2.52321	9 0.99950	14 0.94739	19 0.97027	26 0.92833	32 0.95057	39 1.67303	38 1.03318				
5	1382.8	36.0 0.0159	1.53	1 2.55689	10 0.97154	15 1.00966	20 0.97535	27 0.98234	33 0.89339	40 3.81182	43 1.65461				
6	1369.1	32.5 0.0160	1.53					21 0.96201	28 0.96836						

WIND TUNNEL TEST CONDITIONS..... 0 10.317 PT 90.257 PS 1.217 R/L 10.6 MACH 3.480 TEMP 102.5
 MODEL ATTITUDE..... ALPHA 0.04 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS.. PTC= 1370.6 TC= 42.3 PTC/PSA= 1125.91 PSM(22)/PSA= 1.2274
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 1600. HEATER TOTAL TEMPERATURE= 0.

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11 SEPTEMBER 1973

 NSFC TRISONIC WIND TUNNEL HUNTSVILLE, ALABAMA
 PLUME TECHNOLOGY TEST...NON-QUIESCENT PHASE

TEST 575 RUN 71470

FRAME	PSA	PTC	TEMPERATURE DATA---DEGREES FARRENHEIT---					MODEL-STING FEEDER-PIPE		TCH
			SKIN(1)	SKIN(2)	SKIN(3)	SKIN(4)	SKIN(5)			
1	1.21	1911.74	1867.5	75.0	73.7	74.1	150.4	91.5	244.9	108.8
2	1.21	1845.42	1805.9	73.7	73.7	73.7	150.0	93.2	147.8	75.9
3	1.21	1645.42	1605.9	75.4	75.0	74.6	151.3	91.9	189.4	63.3
4	1.21	1443.32	1413.3	74.6	73.7	74.1	147.8	87.6	134.4	46.8
5	1.21	1275.95	1251.7	74.6	73.3	73.3	148.7	81.9	139.6	43.4
6	1.21	1145.95	1127.5	74.1	72.8	72.8	150.4	75.9	88.4	36.0

FR	PTC	TC P47/PTC	PORT-22	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA	NO PSM/PSA
1	1912.3	109.3	0.0135	1.69	5	0.69105	6	0.87702	11	0.94199	16	0.97320	23	0.94517	29	0.93880	34	1.51138	35	0.68850
2	1857.5	78.5	0.0137	1.77	4	0.78467	7	0.89295	12	1.80186	17	0.95091	24	0.98657	30	0.94454	41	1.81519	36	0.90505
3	1646.5	64.6	0.0145	1.71	3	1.47890	8	0.92925	13	1.00313	18	0.97957	25	0.97065	31	0.94199	42	3.82082	37	3.82082
4	1444.9	48.1	0.0155	1.58	2	2.53235	9	1.00504	14	0.95091	19	0.97447	26	0.93180	32	0.95791	39	1.71711	38	1.05854
5	1279.1	44.2	0.0166	1.48	1	2.56420	10	0.97320	15	1.01141	20	0.97766	27	0.98466	33	0.89740	40	3.82082	43	1.59673
6	1147.5	37.7	0.0175	1.41									21	0.96810	28	0.97192				

WIND TUNNEL TEST CONDITIONS..... Q 10.293 PT 90.044 PS 1.215 R/L 10.6 MACH 3.480 TEMP 103.6
 MODEL ATTITUDE..... ALPHA 0.00 BETA 0.00 ROLL 0.0
 AVERAGE MODEL/NOZZLE PARAMETERS... PTC= 1948.0 TC= 63.7 PTC/PSA= 1274.45 PSM(22)/PSA= 1.3207
 HEATER PARAMETERS..... HEATER TOTAL PRESSURE= 2100. HEATER TOTAL TEMPERATURE= 0.

TEST 575 QUA 715/8

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WIND TUNNEL TEST CONDITIONS.....	Q	10.289	PT	90.011	PS	1.214	R/L	10.6	MACH	3.480	TEMP	101.6
MODEL ATTITUDE.....	ALPHA	0.02	BETA	0.00	ROLL	0.0						
AVERAGE MODEL/NOZZLE PARAMETERS..	PTC	1243.3	TC	537.5	PTC/PSA	1024.01	PSM(221)/PSA= 1.2096					
HEATER PARAMETERS.....	HEATER TOTAL PRESSURE= 1600.					HEATER TOTAL TEMPERATURE= 640.						

Appendix B
PLUME TECHNOLOGY TEST SCHLIEREN
PHOTOGRAPH COORDINATES

Appendix B

Appendix B presents a digitized listing of the observed model exhaust plume's coordinates followed by a listing of the plume's initial internal shock shape coordinates. These data were obtained by reading the schlieren photographs on 35 mm film using a Telecomputing Corp. model 29-E Telereadex film reader and are applicable to the first frame of data only.

Seven sets of data for the plume boundaries are provided and five sets of data for the plume internal shock shapes are given. Due to the flow interaction, no attempt was made to read the shock shapes for the triple nozzle pressure runs therefore there is not a corresponding set of shock coordinates for the last two sets of plume boundary data.

Each set of data consists of the identifying photograph number as specified in Table B-1, and X and R coordinate in inches for the upper half of the plumes, and the nondimensionalized plume coordinates.

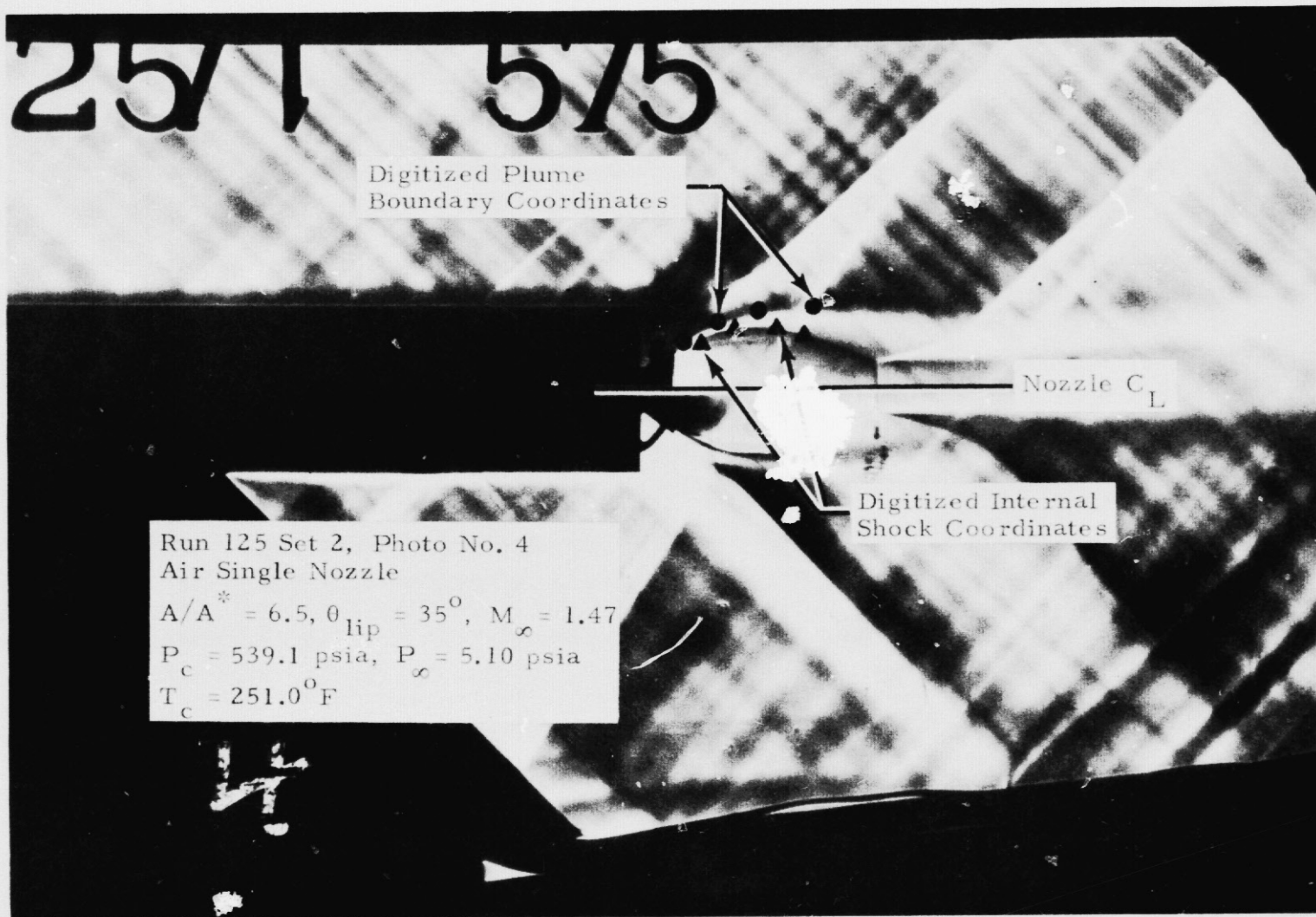
Table B-1 gives the cross reference relating run number to set and photograph number. Figure B-1 shows typical values of the coordinates read superimposed on the schlieren photographs.

Table B-1
SCHLIEREN PHOTOGRAPH LISTING

Run	Set	Photo	Run	Set	Photo
102	0	4	220	0	13
103	↓	6	221	↓	15
104	↓	7	222	↓	16
105	↓	9	223	↓	18
107	↓	22	224	↓	20
108	↓	23	308	4	56
109	1	7	309	↓	58
110	↓	8	310	↓	60
111	↓	4	311	↓	62
112	↓	14	312	3	13
113	↓	15	315	↓	11
114	↓	17	319	↓	27
115	↓	18	320	↓	25
119	↓	25	336	4	82
120	↓	23	337	↓	84
124	↓	20	340	↓	90
125	2	3	341	↓	88
129	↓	1	343	↓	86
130	↓	13	356	3	23
131	↓	21	359	↓	21
132	↓	9	360	↓	15
134	↓	11	363	↓	19
155	1	29	364	↓	9
159	↓	32	367	↓	7
160	↓	33	370	4	76
164	↓	27	376	↓	74
165	2	5	377	↓	72
169	↓	7	379	3	3
200	↓	47	380	↓	5
204	1	43	381	↓	1
205	↓	41	382	↓	29
209	↓	39	383	↓	31
210	2	37	384	↓	33
211	↓	34	385	↓	36
212	↓	38	401	5	17
213	↓	27	402	↓	22
214	↓	25	403	↓	24
218	↓	43	404	↓	26

Table B-1 (Concluded)

Run	Set	Photo	Run	Set	Photo
405	5 ↓	28	547	6	56
406		30	554	6	54
408		50	611	5	10
409		48	627	↓	2
410		46	628		4
411		44	629		6
438		54	630		8
440		62	631		15
441		60	701		98
442		58	702		83
443		56	703		81
444		42	704		79
447		40	705		78
448		36	706		85
451		34	707		87
452		32	708		89
455		38	709		92
468		68	710		106
469		70	711		102
470		72	712		96
471		74	713		100
475		52	714		94
501		9	715		104
502		7			
503		1			
504		3			
505		5			
506		11			
507		13			
508		23			
509		15			
511		17			
512		20			
513		25			
514		28			
515		36			
522		38			
523		48			
524		46			
525		44			
526		42			
527		40			
528		34			
537		30			
538		32			
546		52			



B-5

Fig. B-1 - Plume Boundary and Internal Shock Coordinates Superimposed on the Schlieren Photograph

VISCOUS PLUME BOUNDARY COORDINATES: SET 4

PHOTO NO.	X (INCHES)	R (INCHES)	Y/REVIT	R/REFIT
4	0.700	0.351	0.000	1.000
4	0.192	0.546	0.550	1.560
4	0.290	0.603	0.830	1.722
4	0.406	0.693	1.160	1.980
4	0.522	0.779	1.492	2.222
4	0.640	0.862	1.830	2.462
4	0.763	0.935	2.180	2.672
4	0.877	1.015	2.505	2.900
4	0.998	1.088	2.852	3.107
4	1.131	1.172	3.232	3.350
4	1.271	1.254	3.632	3.582
4	1.414	1.306	4.040	3.732
4	1.571	1.376	4.487	3.932
4	1.725	1.421	4.927	4.060
4	1.848	1.464	5.280	4.182
4	2.031	1.513	5.802	4.322
4	2.174	1.540	6.212	4.400
4	2.300	1.576	6.572	4.502
4	2.407	1.600	6.877	4.572
4	2.586	1.635	7.390	4.672
4	2.670	1.645	7.627	4.700
4	2.818	1.680	8.052	4.800
4	2.899	1.689	8.282	4.825
4	2.992	1.683	8.547	4.810
4	3.097	1.681	8.850	4.802

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VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
6	0.000	0.000	0.000	0.000
6	0.000	0.349	0.000	0.996
6	0.082	0.444	0.233	1.269
6	0.152	0.513	0.436	1.467
6	0.237	0.587	0.676	1.678
6	0.300	0.644	0.856	1.841
6	0.377	0.718	1.078	2.052
6	0.450	0.789	1.287	2.254
6	0.541	0.852	1.545	2.434
6	0.651	0.927	1.861	2.650
6	0.728	1.001	2.081	2.859
6	0.840	1.080	2.401	3.085
6	0.959	1.160	2.741	3.314
6	1.083	1.230	3.094	3.514
6	1.194	1.307	3.412	3.734
6	1.335	1.377	3.814	3.934
6	1.472	1.453	4.206	4.150
6	1.670	1.540	4.772	4.471
6	1.826	1.587	5.217	4.535
6	1.986	1.634	5.675	4.668
6	2.129	1.690	6.082	4.828
6	2.284	1.740	6.526	4.970
6	2.371	1.780	6.775	5.086
6	2.476	1.824	7.075	5.210
6	2.586	1.858	7.380	5.308
6	2.807	1.900	8.020	5.428
6	2.980	1.967	8.514	5.619
6	3.108	1.996	8.880	5.704
6	3.220	2.026	9.200	5.788

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	X (INCHES)	R (INCHES)	X/REYIT	R/REYIT
7	0.000	0.000	0.000	0.000
7	0.000	0.355	0.000	1.014
7	0.080	0.473	0.229	1.351
7	0.130	0.534	0.371	1.525
7	0.182	0.602	0.520	1.720
7	0.234	0.681	0.669	1.945
7	0.296	0.762	0.847	2.176
7	0.344	0.828	0.983	2.365
7	0.406	0.897	1.162	2.563
7	0.475	0.968	1.356	2.765
7	0.555	1.055	1.585	3.014
7	0.611	1.130	1.745	3.228
7	0.696	1.213	1.967	3.465
7	0.771	1.289	2.203	3.683
7	0.876	1.382	2.503	3.948
7	0.972	1.472	2.776	4.206
7	1.088	1.565	3.110	4.472
7	1.205	1.680	3.443	4.799
7	1.364	1.777	3.897	5.077
7	1.519	1.882	4.339	5.377
7	1.659	1.973	4.741	5.637
7	1.819	2.074	5.197	5.926
7	1.965	2.161	5.615	6.175
7	2.122	2.248	6.064	6.424
7	2.248	2.337	6.424	6.677
7	2.398	2.402	6.851	6.862
7	2.559	2.465	7.311	7.242
7	2.696	2.530	7.702	7.229
7	2.814	2.586	8.240	7.389
7	2.944	2.636	8.411	7.531

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VISCOUS PLUME BOUNDARY COORDINATES, SET 0

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
9	0.000	0.000	0.000	0.000
9	0.000	0.360	0.000	1.029
9	0.100	0.542	0.285	1.549
9	0.152	0.634	0.420	1.812
9	0.205	0.713	0.585	2.036
9	0.234	0.768	0.660	2.194
9	0.281	0.839	0.802	2.398
9	0.326	0.908	0.931	2.594
9	0.375	0.983	1.071	2.810
9	0.443	1.049	1.267	2.996
9	0.518	1.123	1.480	3.201
9	0.561	1.180	1.603	3.372
9	0.627	1.250	1.792	3.597
9	0.703	1.350	2.007	3.857
9	0.783	1.432	2.236	4.092
9	0.866	1.526	2.474	4.303
9	0.962	1.598	2.747	4.566
9	1.059	1.702	3.025	4.864
9	1.153	1.786	3.294	5.104
9	1.236	1.867	3.532	5.335
9	1.314	1.945	3.754	5.557
9	1.390	2.016	3.970	5.759
9	1.467	2.091	4.192	5.975
9	1.560	2.157	4.484	6.162
9	1.652	2.228	4.721	6.366
9	1.741	2.307	4.975	6.591
9	1.830	2.386	5.255	6.818
9	1.948	2.458	5.566	7.024
9	2.046	2.536	5.846	7.247
9	2.154	2.590	6.155	7.424
9	2.252	2.658	6.433	7.593
9	2.363	2.720	6.751	7.771
9	2.481	2.795	7.080	7.985
9	2.566	2.844	7.331	8.125

VISCOUS PLUME BOUNDARY COORDINATES. SET A

PHOTO NO.	V (INCHES)	R (INCHES)	X/REFIT	R/REFIT
12	0.000	0.000	0.000	0.000
12	0.000	0.335	0.000	0.958
12	0.112	0.415	0.320	1.185
12	0.200	0.486	0.596	1.389
12	0.299	0.549	0.854	1.569
12	0.386	0.589	1.103	1.683
12	0.464	0.640	1.325	1.829
12	0.566	0.702	1.616	2.005
12	0.669	0.766	1.912	2.187
12	0.759	0.818	2.167	2.336
12	0.837	0.876	2.392	2.503
12	0.911	0.933	2.603	2.665
12	1.008	0.964	2.881	2.754
12	1.157	0.998	3.305	2.852
12	1.332	1.048	3.806	2.994
12	1.490	1.091	4.257	3.116
12	1.664	1.120	4.755	3.199
12	1.817	1.151	5.193	3.288
12	1.982	1.173	5.662	3.352
12	2.140	1.200	6.115	3.428
12	2.262	1.216	6.464	3.474
12	2.430	1.231	6.944	3.517
12	2.601	1.235	7.431	3.530

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
13	0.000	0.351	0.000	1.000
13	0.184	0.564	0.525	1.612
13	0.291	0.645	0.832	1.842
13	0.428	0.743	1.222	2.122
13	0.551	0.834	1.575	2.382
13	0.675	0.906	1.927	2.587
13	0.834	1.023	2.382	2.922
13	0.963	1.114	2.752	3.182
13	1.093	1.197	3.122	3.420
13	1.234	1.253	3.525	3.580
13	1.364	1.322	3.897	3.772
13	1.499	1.383	4.282	3.952
13	1.642	1.453	4.692	4.152
13	1.789	1.522	5.112	4.347
13	1.962	1.587	5.645	4.515
13	2.145	1.625	6.130	4.642
13	2.380	1.641	6.625	4.802
13	2.637	1.746	7.535	4.987
13	2.767	1.798	7.985	5.137
13	2.895	1.846	8.272	5.275

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	V (INCHES)	R (INCHES)	V/REVIT	R/REVIT
15	0.100	0.350	0.600	1.000
15	0.182	0.582	0.520	1.662
15	0.272	0.654	0.777	1.870
15	0.367	0.738	1.050	2.107
15	0.430	0.820	1.230	2.312
15	0.511	0.896	1.460	2.560
15	0.593	0.966	1.695	2.760
15	0.670	1.025	1.915	2.930
15	0.747	1.109	2.135	3.170
15	0.820	1.168	2.370	3.337
15	0.895	1.226	2.557	3.502
15	0.970	1.288	2.797	3.680
15	1.065	1.320	3.042	3.797
15	1.151	1.395	3.290	3.985
15	1.249	1.448	3.570	4.137
15	1.344	1.516	3.840	4.332
15	1.427	1.567	4.077	4.477
15	1.522	1.621	4.350	4.630
15	1.624	1.664	4.640	4.755
15	1.764	1.739	5.040	4.967
15	1.882	1.820	5.377	5.167
15	2.002	1.857	5.720	5.305
15	2.119	1.914	6.055	5.480
15	2.274	1.979	6.497	5.655
15	2.420	2.021	6.940	5.775
15	2.570	2.092	7.342	5.977
15	2.693	2.143	7.695	6.122
15	2.824	2.201	8.067	6.285
15	2.944	2.236	8.412	6.393
15	3.099	2.272	8.855	6.492
15	3.283	2.313	9.282	6.610
15	3.457	2.336	9.877	6.657

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VISCIOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
16	0.200	0.200	0.200	0.000
16	0.200	0.364	0.200	1.040
16	0.289	0.491	0.256	1.403
16	0.184	0.612	0.527	1.749
16	0.282	0.734	0.805	2.096
16	0.385	0.839	1.100	2.398
16	0.488	0.930	1.394	2.659
16	0.601	1.016	1.716	2.903
16	0.709	1.113	2.023	3.181
16	0.817	1.201	2.334	3.432
16	0.920	1.290	2.654	3.685
16	1.027	1.369	2.934	3.910
16	1.148	1.456	3.270	4.159
16	1.267	1.551	3.610	4.432
16	1.384	1.624	3.954	4.639
16	1.526	1.705	4.350	4.870
16	1.671	1.803	4.775	5.153
16	1.827	1.882	5.210	5.377
16	1.957	1.941	5.573	5.546
16	2.097	2.024	5.973	5.784
16	2.249	2.127	6.426	5.999
16	2.486	2.215	7.104	6.328
16	2.732	2.304	7.807	6.584
16	2.926	2.385	8.360	6.818
16	3.090	2.445	8.820	6.986
16	3.231	2.483	9.232	7.093
16	3.386	2.530	9.674	7.255
16	3.588	2.592	10.252	7.404

VISCOUS PLUME BOUNDARY COORDINATES, SET 9

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
18	0.000	0.000	0.000	0.000
18	0.000	0.367	0.000	1.029
18	0.100	0.504	0.285	1.440
18	0.224	0.644	0.640	1.841
18	0.337	0.768	0.962	2.194
18	0.455	0.878	1.300	2.510
18	0.545	0.959	1.556	2.741
18	0.638	1.055	1.823	3.014
18	0.750	1.148	2.143	3.279
18	0.857	1.238	2.447	3.537
18	0.941	1.319	2.687	3.768
18	1.033	1.405	2.952	4.014
18	1.120	1.484	3.201	4.239
18	1.221	1.550	3.488	4.428
18	1.326	1.626	3.790	4.646
18	1.423	1.695	4.066	4.844
18	1.510	1.761	4.339	5.030
18	1.628	1.827	4.650	5.219
18	1.734	1.905	4.955	5.444
18	1.824	1.960	5.210	5.599
18	1.908	2.007	5.450	5.735
18	1.990	2.053	5.711	5.866
18	2.094	2.122	5.984	6.062
18	2.191	2.164	6.260	6.182
18	2.286	2.220	6.531	6.368
18	2.393	2.277	6.838	6.506
18	2.488	2.319	7.086	6.626
18	2.585	2.362	7.384	6.749
18	2.702	2.408	7.720	6.880
18	2.810	2.468	8.020	7.051
18	2.917	2.518	8.333	7.193
18	3.070	2.561	8.794	7.318
18	3.187	2.639	9.107	7.540
18	3.296	2.670	9.418	7.629
18	3.405	2.734	9.720	7.727

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
20	0.000	0.000	0.000	0.000
22	0.000	0.363	0.000	1.036
22	0.080	0.554	0.251	1.583
20	0.170	0.663	0.487	1.894
20	0.260	0.770	0.742	2.225
20	0.371	0.878	1.060	2.510
20	0.464	0.980	1.325	2.799
20	0.572	1.077	1.634	3.076
20	0.665	1.170	1.901	3.343
20	0.761	1.260	2.174	3.599
20	0.850	1.348	2.454	3.852
20	0.942	1.425	2.692	4.070
20	1.056	1.527	3.014	4.363
20	1.166	1.617	3.332	4.619
20	1.237	1.680	3.534	4.801
20	1.330	1.753	3.790	5.008
20	1.443	1.845	4.123	5.273
20	1.564	1.923	4.468	5.495
20	1.662	1.997	4.748	5.706
20	1.772	2.078	5.064	5.937
20	1.863	2.154	5.324	6.153
20	1.970	2.210	5.655	6.313
20	2.104	2.281	6.011	6.517
20	2.216	2.358	6.331	6.737
20	2.318	2.427	6.624	6.935
20	2.430	2.486	6.944	7.174
20	2.560	2.557	7.315	7.304
20	2.683	2.616	7.664	7.473
20	2.802	2.667	8.005	7.620
20	2.917	2.721	8.334	7.773
20	3.030	2.760	8.658	7.911
20	3.140	2.838	8.971	8.109
20	3.220	2.870	9.227	8.225
20	3.327	2.926	9.505	8.367

VISCOUS PLUME BOUNDARY COORDINATES, SET 0

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
22	0.000	0.000	0.000	0.000
22	0.000	0.361	0.000	1.231
22	0.050	0.475	0.142	1.358
22	0.094	0.563	0.269	1.609
22	0.145	0.648	0.413	1.852
22	0.209	0.728	0.596	2.081
22	0.303	0.822	0.865	2.347
22	0.362	0.895	1.034	2.556
22	0.436	0.983	1.247	2.817
22	0.535	1.096	1.520	3.132
22	0.611	1.207	1.745	3.450
22	0.716	1.291	2.045	3.697
22	0.807	1.360	2.305	3.886
22	0.900	1.465	2.572	4.186
22	1.005	1.572	2.872	4.497
22	1.121	1.665	3.203	4.757
22	1.230	1.783	3.514	5.095
22	1.342	1.884	3.834	5.382
22	1.452	1.964	4.148	5.610
22	1.575	2.045	4.501	5.842
22	1.705	2.150	4.873	6.144
22	1.831	2.234	5.230	6.384
22	1.976	2.343	5.646	6.695
22	2.095	2.406	5.986	6.873
22	2.207	2.476	6.306	7.073
22	2.335	2.552	6.671	7.201
22	2.474	2.642	7.060	7.549
22	2.610	2.744	7.480	7.851
22	2.751	2.837	7.860	8.137

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VISCOUS PLUME BOUNDARY COORDINATES. SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
23	0.000	0.350	0.000	1.000
23	0.284	0.584	0.812	1.647
23	0.386	0.644	1.102	1.840
23	0.474	0.704	1.355	2.000
23	0.592	0.750	1.692	2.170
23	0.732	0.836	2.092	2.390
23	0.866	0.899	2.475	2.570
23	1.018	0.969	2.917	2.770
23	1.167	1.028	3.335	2.937
23	1.307	1.095	3.735	3.130
23	1.471	1.154	4.202	3.297
23	1.654	1.194	4.725	3.417
23	1.838	1.243	5.252	3.552
23	2.039	1.278	5.825	3.652
23	2.210	1.288	6.315	3.680
23	2.391	1.291	6.832	3.687
23	2.627	1.302	7.505	3.720
23	2.848	1.302	8.137	3.720
23	3.056	1.309	8.732	3.740
23	3.317	1.281	9.477	3.660
23	3.517	1.256	10.047	3.590
23	3.782	1.242	10.805	3.547

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PROB NO.	V (INCHES)	R (INCHES)	V/REFIT	R/REFIT
4	0.000	0.351	0.000	1.000
4	0.000	0.400	0.000	1.165
4	0.074	0.517	0.212	1.477
4	0.154	0.611	0.440	1.745
4	0.212	0.671	0.600	1.917
4	0.260	0.730	0.767	2.285
4	0.332	0.780	0.950	2.227
4	0.413	0.840	1.180	2.425
4	0.500	0.915	1.427	2.615
4	0.576	0.988	1.645	2.822
4	0.640	1.041	1.830	2.975
4	0.720	1.111	2.057	3.175
4	0.794	1.163	2.267	3.322
4	0.853	1.200	2.437	3.455
4	0.907	1.309	2.877	3.740
4	0.967	1.340	3.250	3.855
4	1.051	1.402	3.290	4.075
4	1.233	1.453	3.522	4.152
4	1.380	1.552	3.967	4.435
4	1.485	1.605	4.242	4.585
4	1.580	1.655	4.515	4.730
4	1.662	1.700	4.750	4.882
4	1.740	1.748	4.977	4.905
4	1.816	1.804	5.190	5.155
4	1.904	1.856	5.440	5.302
4	2.033	1.907	5.810	5.450
4	2.123	1.945	6.065	5.557
4	2.194	1.990	6.267	5.685

VISCOS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
7	0.400	0.354	0.400	1.000
7	0.400	0.400	0.400	1.142
7	0.470	0.470	0.500	1.342
7	0.495	0.500	0.500	1.452
7	0.450	0.553	0.430	1.580
7	0.494	0.595	0.555	1.700
7	0.541	0.626	0.695	1.700
7	0.604	0.675	0.867	1.930
7	0.651	0.784	1.087	2.240
7	0.611	0.830	1.460	2.372
7	0.591	0.860	1.690	2.482
7	0.651	0.908	1.860	2.605
7	0.713	0.950	2.037	2.720
7	0.786	0.995	2.245	2.842
7	0.864	1.037	2.470	2.962
7	0.962	1.081	2.750	3.100
7	1.043	1.117	2.080	3.102
7	1.116	1.150	3.190	3.312
7	1.182	1.187	3.377	3.392
7	1.326	1.257	3.787	3.592
7	1.417	1.295	4.050	3.700
7	1.511	1.335	4.317	3.815
7	1.585	1.377	4.530	3.935
7	1.682	1.421	4.800	4.060
7	1.774	1.440	5.080	4.137
7	1.860	1.491	5.340	4.267
7	1.964	1.523	5.610	4.352

WISCONSIN PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
8	0.700	0.350	0.000	1.000
8	0.705	0.411	0.015	1.175
8	0.053	0.472	0.152	1.365
8	0.112	0.543	0.320	1.607
8	0.175	0.625	0.500	1.785
8	0.390	0.824	1.140	2.355
8	0.448	0.871	1.280	2.487
8	0.507	0.914	1.450	2.612
8	0.556	0.967	1.590	2.762
8	0.623	1.017	1.780	2.905
8	0.686	1.060	1.960	3.027
8	0.741	1.090	2.117	3.140
8	0.806	1.143	2.300	3.265
8	0.857	1.175	2.450	3.357
8	0.928	1.232	2.650	3.520
8	1.000	1.284	2.870	3.670
8	1.071	1.337	3.060	3.820
8	1.147	1.391	3.277	3.975
8	1.228	1.451	3.507	4.145
8	1.310	1.500	3.770	4.292
8	1.432	1.552	4.092	4.435
8	1.543	1.627	4.410	4.592
8	1.655	1.654	4.727	4.725
8	1.737	1.718	4.960	4.907
8	1.823	1.780	5.210	5.112
8	0.044	1.921	5.840	5.487
8	2.156	2.017	6.160	5.762
8	2.264	2.011	6.467	5.745
8	2.355	2.054	6.730	5.870
8	2.478	2.102	7.080	6.005

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
14	0.000	0.350	0.000	1.000
14	0.035	0.500	0.100	1.427
14	0.070	0.531	0.200	1.517
14	0.090	0.572	0.282	1.635
14	0.137	0.608	0.392	1.737
14	0.198	0.665	0.565	1.902
14	0.234	0.700	0.670	2.000
14	0.263	1.733	0.752	2.095
14	0.326	0.701	0.932	2.260
14	0.378	0.843	1.080	2.407
14	0.444	0.806	1.270	2.507
14	0.519	1.062	1.482	2.747
14	0.581	1.018	1.660	2.910
14	0.665	1.078	1.900	3.180
14	0.753	1.156	2.152	3.302
14	0.836	1.211	2.390	3.460
14	0.931	1.274	2.660	3.640
14	1.036	1.336	2.960	3.817
14	1.124	1.406	3.212	4.017
14	1.190	1.470	3.412	4.200
14	1.238	1.520	3.537	4.367
14	1.373	1.611	3.822	4.622
14	1.494	1.676	4.270	4.787
14	1.500	1.730	4.567	4.970
14	1.709	1.800	4.882	5.170
14	1.820	1.893	5.200	5.410
14	1.933	1.977	5.522	5.647
14	2.100	2.046	6.000	5.845
14	2.236	2.121	6.390	6.160
14	2.367	2.177	6.762	6.220
14	2.513	2.236	7.140	6.390
14	2.657	2.321	7.592	6.627
14	2.801	2.387	8.022	6.820
14	2.935	2.467	8.355	7.047
14	3.053	2.530	8.722	7.230

WISCONSIN PLUME BOUNDARY COORDINATES. SET 1

PHOTO NO.	Y (INCHES)	X (INCHES)	Y/REVIT	R/REVIT
15	0.000	0.350	0.000	1.000
15	0.000	0.412	0.000	1.177
15	0.030	0.512	0.112	1.462
15	0.088	0.588	0.252	1.688
15	0.137	0.637	0.392	1.828
15	0.160	0.677	0.482	1.935
15	0.214	0.715	0.612	2.242
15	0.248	0.757	0.717	2.162
15	0.305	0.808	0.872	2.318
15	0.343	0.859	0.988	2.455
15	0.381	0.899	1.092	2.578
15	0.440	0.948	1.257	2.710
15	0.490	1.001	1.400	2.863
15	0.550	1.053	1.572	3.210
15	0.610	1.125	1.742	3.157
15	0.680	1.155	1.870	3.300
15	0.757	1.211	2.162	3.460
15	0.824	1.263	2.297	3.610
15	0.860	1.310	2.482	3.770
15	0.930	1.354	2.682	3.867
15	0.986	1.403	2.817	4.210
15	1.046	1.450	2.991	4.167
15	1.123	1.516	3.210	4.332
15	1.194	1.564	3.412	4.472
15	1.270	1.590	3.630	4.552
15	1.333	1.631	3.810	4.662
15	1.400	1.676	4.000	4.790
15	1.471	1.720	4.200	4.915
15	1.548	1.771	4.420	5.160
15	1.613	1.823	4.610	5.207
15	1.704	1.880	4.870	5.372
15	1.792	1.935	5.120	5.532
15	1.992	2.024	5.692	5.782
15	2.080	2.046	5.967	5.960
15	2.167	2.136	6.192	6.102
15	2.285	2.180	6.530	6.230
15	2.383	2.227	6.807	6.362
15	2.480	2.264	7.110	6.470
15	2.606	2.303	7.440	6.580
15	2.722	2.348	7.777	6.710
15	2.774	2.386	7.932	6.817

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VISCOUS PLANE BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
17	0.200	1.350	0.200	1.000
17	0.200	0.431	0.000	1.232
17	0.231	0.508	0.090	1.452
17	0.255	0.577	0.157	1.650
17	0.291	0.613	0.260	1.752
17	0.315	0.658	0.330	1.880
17	0.350	0.711	0.430	2.032
17	0.374	0.740	0.497	2.140
17	0.403	0.792	0.580	2.262
17	0.437	0.830	0.677	2.372
17	0.469	0.860	0.770	2.482
17	0.498	0.911	0.852	2.602
17	0.543	0.956	0.980	2.732
17	0.584	1.000	1.097	2.855
17	0.637	1.054	1.250	3.012
17	0.689	1.108	1.397	3.165
17	0.730	1.158	1.540	3.310
17	0.775	1.213	1.642	3.465
17	0.823	1.257	1.780	3.592
17	0.868	1.292	1.907	3.692
17	0.906	1.327	2.017	3.792
17	0.938	1.361	2.097	3.890
17	0.970	1.393	2.200	3.980
17	1.012	1.423	2.320	4.065
17	1.040	1.447	2.400	4.135
17	1.067	1.465	2.477	4.185
17	1.090	1.494	2.567	4.270
17	1.034	1.529	2.667	4.373
17	1.110	1.602	2.812	4.577
17	1.160	1.639	3.027	4.682
17	1.201	1.673	3.145	4.780
17	1.247	1.713	3.277	4.895
17	1.298	1.757	3.422	5.020
17	1.260	1.786	3.600	5.102
17	1.311	1.816	3.745	5.190
17	1.347	1.847	3.850	5.277
17	1.380	1.880	3.967	5.387
17	1.438	1.922	4.127	5.492
17	1.492	1.960	4.262	5.625
17	1.543	2.013	4.410	5.752
17	1.596	2.048	4.560	5.852
17	1.650	2.094	4.715	5.982
17	1.714	2.131	4.897	6.090
17	1.795	2.174	5.127	6.212
17	1.847	2.221	5.277	6.345
17	1.918	2.265	5.480	6.472
17	1.994	2.313	5.697	6.610
17	2.071	2.358	5.917	6.737
17	2.140	2.402	6.137	6.862

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
18	0.000	0.351	0.000	1.000
18	0.000	0.323	0.000	1.122
18	0.050	0.423	0.170	1.210
18	0.111	0.451	0.317	1.290
18	0.160	0.472	0.457	1.350
18	0.213	0.487	0.613	1.392
18	0.276	0.514	0.787	1.440
18	0.350	0.517	1.000	1.477
18	0.416	0.533	1.190	1.522
18	0.486	0.540	1.392	1.570
18	0.664	0.559	1.897	1.507
18	0.734	0.564	2.097	1.612
18	0.810	0.573	2.340	1.637
18	0.888	0.581	2.537	1.660
18	0.965	0.591	2.757	1.687
18	1.032	0.602	2.950	1.720
18	1.110	0.609	3.197	1.712
18	1.195	0.605	3.415	1.730
18	1.293	0.614	3.695	1.755
18	1.375	0.616	3.930	1.760
18	1.452	0.616	4.147	1.760

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
20	0.000	0.350	0.000	1.000
20	0.000	0.394	0.000	1.125
20	0.041	0.429	0.117	1.225
20	0.070	0.458	0.225	1.310
20	0.118	0.485	0.337	1.385
20	0.184	0.514	0.525	1.467
20	0.250	0.534	0.740	1.525
20	0.322	0.564	0.920	1.612
20	0.376	0.583	1.080	1.665
20	0.447	0.597	1.277	1.705
20	0.514	0.613	1.467	1.752
20	0.581	0.628	1.660	1.795
20	0.664	0.647	1.897	1.847
20	0.742	0.668	2.120	1.910
20	0.800	0.683	2.285	1.952
20	0.882	0.702	2.520	2.005
20	0.950	0.724	2.740	2.012
20	1.053	0.712	3.010	2.035
20	1.138	0.718	3.252	2.052
20	1.235	0.724	3.530	2.067

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	X (INCHES)	X/REXIT	R/REXIT
23	0.000	0.350	0.000	1.000
23	0.054	0.468	0.155	1.337
23	0.112	0.518	0.320	1.480
23	0.174	0.561	0.497	1.602
23	0.238	0.600	0.680	1.740
23	0.308	0.654	0.880	1.867
23	0.384	0.702	1.097	2.005
23	0.476	0.745	1.360	2.130
23	0.577	0.784	1.650	2.240
23	0.707	0.836	2.020	2.387
23	0.822	0.882	2.347	2.520
23	0.934	0.928	2.670	2.652
23	1.040	0.976	2.997	2.700
23	1.256	1.011	3.590	2.890
23	1.354	1.022	3.867	2.920
23	1.474	1.048	4.212	2.995
23	1.595	1.063	4.557	3.037
23	1.735	1.078	4.957	3.080
23	1.860	1.102	5.315	3.150
23	1.967	1.122	5.620	3.205
23	2.080	1.141	5.970	3.260

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VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
25	0.000	0.354	0.000	1.000
25	0.000	0.408	0.000	1.165
25	0.048	0.462	0.137	1.320
25	0.119	0.515	0.340	1.472
25	0.203	0.570	0.580	1.630
25	0.269	0.612	0.767	1.747
25	0.384	0.659	1.097	1.882
25	0.481	0.700	1.375	2.000
25	0.566	0.743	1.617	2.122
25	0.671	0.782	1.917	2.235
25	0.776	0.833	2.217	2.380
25	0.892	0.878	2.550	2.510
25	1.003	0.910	2.865	2.600
25	1.130	0.937	3.227	2.677
25	1.230	0.971	3.540	2.775
25	1.340	1.097	3.830	2.850
25	1.442	1.029	4.127	2.940
25	1.543	1.064	4.410	3.040
25	1.648	1.101	4.710	3.145
25	1.746	1.134	4.990	3.240

WISCONSIN CLIMATE BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
27	0.200	0.350	0.200	1.000
27	0.400	0.394	0.400	1.125
27	0.605	0.450	0.242	1.310
27	0.231	0.510	0.660	1.480
27	0.350	0.550	1.022	1.597
27	0.460	0.587	1.340	1.677
27	0.584	0.596	1.667	1.702
27	0.697	0.600	1.992	1.740
27	0.826	0.616	2.360	1.760
27	0.960	0.620	2.765	1.772
27	1.085	0.631	3.180	1.802
27	1.466	0.631	4.187	1.802
27	1.557	0.633	4.447	1.807
27	1.642	0.649	4.692	1.855
27	1.760	0.673	5.055	1.922
27	1.890	0.683	5.422	1.952
27	2.010	0.692	5.742	1.977
27	2.124	0.706	6.067	2.017
27	2.306	0.722	6.590	2.062

VISCOUS PLUME BOUNDARY COORDINATES. SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
29	0.000	0.350	0.000	1.000
29	0.087	0.434	0.247	1.240
29	0.212	0.481	0.605	1.375
29	0.333	0.522	0.952	1.492
29	0.450	0.556	1.285	1.587
29	0.578	0.586	1.652	1.675
29	0.689	0.581	1.967	1.660
29	0.822	0.589	2.347	1.682
29	0.935	0.581	2.672	1.660
29	1.051	0.583	3.002	1.665
29	1.178	0.590	3.365	1.685
29	1.328	0.589	3.795	1.682
29	1.484	0.589	4.240	1.682
29	1.647	0.587	4.705	1.677
29	1.702	0.577	4.862	1.647
29	1.951	0.585	5.575	1.672
29	2.153	0.582	6.152	1.662
29	2.335	0.597	6.672	1.705
29	2.557	0.618	7.305	1.765
29	2.769	0.631	7.912	1.802
29	2.987	0.627	8.535	1.792
29	3.672	0.628	10.492	1.795
29	3.914	0.639	11.182	1.825
29	4.133	0.648	11.810	1.852

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
32	0.000	0.350	0.000	1.000
32	0.000	0.391	0.000	1.117
32	0.063	0.454	0.180	1.297
32	0.123	0.502	0.352	1.435
32	0.196	0.549	0.560	1.567
32	0.280	0.596	0.800	1.702
32	0.382	0.636	1.092	1.817
32	0.494	0.675	1.412	1.927
32	0.631	0.711	1.802	2.032
32	0.770	0.751	2.222	2.145
32	0.923	0.780	2.637	2.230
32	1.050	0.811	3.022	2.317
32	1.200	0.832	3.427	2.377
32	1.343	0.850	3.837	2.427
32	1.485	0.858	4.242	2.452
32	1.557	0.874	4.450	2.497
32	1.670	0.878	4.772	2.507
32	1.780	0.892	5.110	2.547
32	1.901	0.906	5.432	2.590
32	2.075	0.909	5.927	2.597
32	2.220	0.926	6.342	2.645

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VISCOUS PLUME BOUNDARY COORDINATES. SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
33	0.000	0.350	0.000	1.000
33	0.020	0.388	0.000	1.107
33	0.066	0.445	0.187	1.272
33	0.143	0.515	0.412	1.472
33	0.227	0.588	0.647	1.688
33	0.319	0.648	0.912	1.852
33	0.436	0.715	1.245	2.042
33	0.576	0.767	1.645	2.192
33	0.710	0.813	2.027	2.322
33	0.836	0.869	2.390	2.482
33	0.966	0.913	2.760	2.610
33	1.116	0.967	3.190	2.762
33	1.294	1.020	3.697	2.882
33	1.480	1.051	4.227	3.002
33	1.651	1.081	4.717	3.090
33	1.833	1.110	5.237	3.172
33	1.984	1.144	5.670	3.270
33	2.130	1.166	6.112	3.332
33	2.296	1.191	6.560	3.402
33	2.468	1.215	7.052	3.472
33	2.663	1.242	7.610	3.550
33	2.852	1.233	8.147	3.522
33	3.041	1.221	8.690	3.490

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO #.	Y (INCHES)	X (INCHES)	Y/REFIT	X/REFIT
19	0.000	0.350	0.000	1.000
19	0.000	0.410	0.000	1.172
19	0.050	0.477	0.142	1.362
19	0.094	0.521	0.270	1.490
19	0.157	0.577	0.450	1.650
19	0.227	0.641	0.650	1.832
19	0.302	0.708	0.862	2.022
19	0.388	0.735	1.110	2.100
19	0.472	0.766	1.347	2.187
19	0.566	0.814	1.617	2.325
19	0.633	0.852	1.810	2.435
19	0.721	0.892	2.060	2.550
19	0.832	0.934	2.377	2.670
19	0.931	0.977	2.660	2.792
19	1.039	1.015	2.967	2.900
19	1.137	1.058	3.250	3.022
19	1.246	1.078	3.560	3.080
19	1.337	1.100	3.820	3.167
19	1.426	1.131	4.075	3.232
19	1.520	1.152	4.367	3.292
19	1.624	1.173	4.640	3.352
19	1.718	1.187	4.907	3.392
19	1.837	1.201	5.247	3.432
19	1.917	1.209	5.477	3.455
19	2.022	1.233	5.777	3.522
19	2.121	1.249	6.060	3.570
19	2.253	1.265	6.437	3.615
19	2.358	1.276	6.737	3.645
19	2.467	1.289	7.050	3.682
19	2.597	1.299	7.422	3.712
19	2.730	1.314	7.825	3.755
19	2.882	1.328	8.227	3.795
19	3.015	1.339	8.615	3.825
19	3.140	1.362	8.997	3.892
19	3.318	1.375	9.480	3.930
19	3.412	1.372	9.750	3.920
19	3.531	1.366	10.087	3.902
19	3.667	1.372	10.477	3.920
19	3.798	1.387	10.852	3.962

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

DEPTH NO.	Y (INCHES)	X (INCHES)	Y/REYIT	X/REYIT
41	0.000	0.350	0.000	1.000
41	0.000	0.385	0.000	1.100
41	0.107	0.477	0.305	1.362
41	0.260	0.543	0.742	1.552
41	0.398	0.595	1.137	1.702
41	0.525	0.624	1.502	1.782
41	0.640	0.652	1.830	1.862
41	0.899	0.682	2.567	1.950
41	1.178	0.722	3.480	2.062
41	1.262	0.734	3.605	2.097
41	1.452	0.745	4.147	2.127
41	1.600	0.753	4.572	2.152
41	1.750	0.764	5.000	2.182
41	1.882	0.767	5.377	2.192
41	2.082	0.774	5.947	2.212
41	2.211	0.776	6.317	2.217
41	2.404	0.775	6.872	2.215
41	2.590	0.780	7.400	2.227
41	2.793	0.767	7.080	2.192
41	2.992	0.767	8.550	2.192

VISCOUS PLUME BOUNDARY COORDINATES, SET 1

PHOTO NO.	X (INCHES)	R (INCHES)	X/REYIT	R/REYIT
43	0.000	0.350	0.000	1.000
43	0.000	0.392	0.000	1.120
43	0.078	0.460	0.222	1.315
43	0.190	0.517	0.542	1.477
43	0.308	0.563	0.880	1.610
43	0.406	0.596	1.160	1.702
43	0.528	0.622	1.510	1.777
43	0.641	0.620	1.832	1.772
43	0.754	0.606	2.155	1.732
43	0.890	0.605	2.542	1.727
43	1.025	0.616	2.930	1.760
43	1.157	0.612	3.305	1.750
43	1.318	0.605	3.765	1.730
43	1.472	0.599	4.205	1.712
43	1.586	0.598	4.532	1.710
43	1.683	0.612	4.810	1.750
43	1.829	0.624	5.225	1.772
43	1.987	0.630	5.677	1.800
43	2.124	0.631	6.070	1.802
43	2.275	0.640	6.500	1.830
43	2.424	0.649	6.925	1.855
43	2.565	0.654	7.330	1.870
43	2.727	0.665	7.792	1.900
43	2.879	0.681	8.225	1.945
43	3.049	0.696	8.712	1.990
43	3.230	0.710	9.227	2.027
43	3.447	0.718	9.850	2.052

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

POINT NO.	X (INCHES)	R (INCHES)	X/REYIT	R/REXIT
1	0.000	0.350	0.000	1.000
1	0.031	0.472	0.090	1.347
1	0.071	0.524	0.202	1.497
1	0.127	0.578	0.362	1.652
1	0.200	0.651	0.572	1.860
1	0.294	0.727	0.840	2.077
1	0.416	0.801	1.187	2.290
1	0.523	0.880	1.495	2.537
1	0.647	0.975	1.850	2.785
1	0.785	1.053	2.242	3.010
1	0.936	1.121	2.587	3.202
1	0.936	1.121	2.590	3.202
1	1.075	1.221	3.072	3.400
1	1.183	1.273	3.380	3.637
1	1.310	1.340	3.742	3.830
1	1.440	1.408	4.140	4.022
1	1.593	1.483	4.552	4.237
1	1.732	1.540	4.950	4.400
1	1.798	1.533	5.110	4.380
1	1.894	1.575	5.412	4.500
1	1.988	1.641	5.680	4.687
1	2.234	1.725	6.382	4.927
1	2.430	1.802	6.967	5.147
1	2.647	1.897	7.562	5.420
1	2.874	1.967	8.212	5.620
1	3.097	2.012	8.850	5.750

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
3	0.000	0.350	0.000	1.000
3	0.074	0.517	0.217	1.477
3	0.192	0.657	0.550	1.877
3	0.290	0.746	0.830	2.132
3	0.405	0.830	1.157	2.372
3	0.525	0.906	1.500	2.587
3	0.644	0.991	1.840	2.832
3	0.762	1.073	2.177	3.065
3	0.888	1.165	2.537	3.327
3	1.032	1.257	2.950	3.592
3	1.207	1.342	3.447	3.835
3	1.360	1.424	3.907	4.067
3	1.529	1.514	4.367	4.325
3	1.685	1.607	4.815	4.562
3	1.844	1.674	5.267	4.782
3	2.023	1.750	5.780	5.022
3	2.229	1.820	6.367	5.222
3	2.400	1.900	6.880	5.452
3	2.576	1.965	7.360	5.672
3	2.792	2.075	7.977	5.930
3	3.030	2.157	8.657	6.162
3	3.222	2.245	9.205	6.415
3	3.611	2.397	10.317	6.650
3	3.837	2.457	10.952	7.020
3	4.105	2.502	11.727	7.150
3	4.343	2.530	12.410	7.252

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VISCOUS PLUME BOUNDARY COORDINATES. SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
5	0.000	1.352	0.000	3.863
5	0.000	0.365	0.000	1.043
5	0.255	2.453	0.158	1.294
5	0.124	2.545	0.353	1.558
5	0.187	2.626	0.533	1.789
5	0.295	2.712	0.842	2.027
5	0.373	2.775	1.065	2.214
5	0.447	2.846	1.278	2.418
5	0.543	2.897	1.552	2.563
5	0.668	2.975	1.900	2.785
5	0.812	1.056	2.321	3.016
5	0.961	1.143	2.745	3.265
5	1.070	1.230	3.083	3.541
5	1.241	1.318	3.545	3.766
5	1.403	1.391	4.008	3.974
5	1.551	1.477	4.432	4.219
5	1.680	1.547	4.826	4.421
5	2.213	1.660	5.751	4.768
5	2.188	1.744	6.251	4.973
5	2.330	1.800	6.682	5.141
5	2.477	1.850	7.078	5.310
5	2.590	1.928	7.427	5.508
5	2.755	1.984	7.871	5.668
5	2.900	2.045	8.287	5.844
5	3.105	2.109	8.871	6.026

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	X (INCHES)	Y/REXIT	X/REXIT
7	0.100	1.366	0.000	3.903
7	0.165	0.429	0.184	1.225
7	0.170	0.531	0.487	1.518
7	0.275	0.600	0.787	1.740
7	0.387	0.675	1.105	1.929
7	0.492	0.731	1.405	2.087
7	0.600	0.811	1.747	2.318
7	0.790	0.893	2.256	2.543
7	0.940	0.958	2.685	2.739
7	1.000	0.995	2.856	2.843
7	1.116	1.046	3.190	2.900
7	1.250	1.104	3.572	3.154
7	1.410	1.148	4.054	3.279
7	1.555	1.201	4.443	3.432
7	1.724	1.248	4.926	3.565
7	1.866	1.295	5.333	3.699
7	2.020	1.351	5.771	3.859
7	2.188	1.397	6.251	3.990
7	2.334	1.457	6.669	4.163
7	2.490	1.500	7.140	4.310
7	2.676	1.554	7.644	4.441
7	2.859	1.606	8.160	4.588
7	3.038	1.646	8.680	4.704
7	3.240	1.689	9.256	4.826
7	3.412	1.717	9.749	4.906
7	3.569	1.753	10.198	5.008

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFXIT	R/REFXIT
9	0.000	1.376	0.000	3.930
9	0.000	2.342	0.000	0.976
9	0.056	0.388	0.160	1.109
9	0.140	0.454	0.400	1.296
9	0.240	0.508	0.685	1.452
9	0.361	0.562	1.031	1.607
9	0.483	0.612	1.380	1.747
9	0.623	0.656	1.781	1.874
9	0.796	0.724	2.274	2.069
9	0.968	0.781	2.765	2.232
9	1.133	0.837	3.236	2.392
9	1.463	0.942	4.181	2.692
9	1.643	0.991	4.695	2.832
9	1.830	1.042	5.228	2.976
9	2.030	1.086	5.826	3.103
9	2.234	1.124	6.384	3.212
9	2.441	1.152	6.973	3.292
9	2.612	1.170	7.462	3.368
9	2.842	1.195	8.120	3.414
9	3.000	1.226	8.596	3.503
9	3.246	1.254	9.274	3.583

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REXIT
11	0.000	1.347	0.000	3.848
11	0.000	2.367	0.000	1.049
11	0.050	0.455	0.160	1.300
11	0.164	0.564	0.460	1.612
11	0.230	0.650	0.682	1.881
11	0.324	0.740	0.927	2.114
11	0.410	0.835	1.196	2.385
11	0.538	0.921	1.536	2.632
11	0.654	1.005	1.867	2.872
11	0.811	1.100	2.318	3.165
11	0.987	1.204	2.819	3.441
11	1.147	1.321	3.276	3.717
11	1.337	1.386	3.821	3.961
11	1.521	1.485	4.346	4.243
11	1.884	1.633	5.384	4.666
11	2.085	1.723	5.957	4.924
11	2.287	1.824	6.533	5.210
11	2.522	1.905	7.207	5.444
11	2.726	1.973	7.780	5.637

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VISCOUS FLAME BOUNDARY COORDINATES, SET 2

PLATO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
13	0.300	0.350	0.200	1.200
13	0.266	0.571	0.190	1.632
13	0.120	0.664	0.370	1.897
13	0.178	0.745	0.527	2.127
13	0.241	0.815	0.687	2.330
13	0.320	0.906	0.840	2.500
13	0.438	1.006	1.252	2.875
13	0.530	1.120	1.540	3.200
13	0.658	1.211	1.887	3.460
13	0.783	1.342	2.237	3.835
13	0.920	1.459	2.632	4.167
13	1.074	1.550	3.067	4.427
13	1.217	1.634	3.477	4.670
13	1.354	1.736	3.870	4.960
13	1.489	1.802	4.255	5.147
13	1.603	1.816	4.295	5.187
13	1.648	1.906	4.710	5.445
13	1.963	2.040	5.607	5.855
13	1.951	2.074	5.660	5.932
13	2.131	2.166	6.087	6.190
13	2.393	2.200	6.837	6.570
13	2.400	2.310	6.857	6.600
13	2.544	2.320	7.267	6.830
13	2.427	2.513	5.077	7.180

VISCOUS PLUME BOUNDARY COORDINATES: SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
15	0.000	0.000	0.000	0.000
15	0.000	1.364	0.002	3.897
15	0.000	0.365	0.000	1.043
15	0.023	1.418	0.064	1.194
15	0.063	0.470	0.180	1.343
15	0.140	0.565	0.400	1.614
15	0.181	0.611	0.515	1.745
15	0.243	0.661	0.694	1.887
15	0.310	0.721	0.811	2.061
15	0.390	0.803	1.114	2.294
15	0.483	0.865	1.380	2.472
15	0.747	0.981	2.134	2.803
15	0.891	1.034	2.545	2.954
15	1.262	1.087	3.034	3.105
15	1.207	1.143	3.450	3.265
15	1.368	1.190	3.908	3.399
15	1.659	1.267	4.741	3.619
15	1.811	1.304	5.175	3.726
15	1.055	1.338	5.586	3.823
15	2.094	1.370	5.984	3.914
15	2.385	1.435	6.813	4.099
15	2.530	1.464	7.220	4.183
15	2.679	1.498	7.656	4.279
15	2.866	1.532	8.189	4.377
15	3.042	1.558	8.691	4.450
15	3.221	1.570	9.203	4.510

VISCOUS PLUME BOUNDARY COORDINATES. SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
17	0.000	0.000	0.000	0.000
17	0.000	1.344	0.000	3.841
17	0.000	1.380	0.000	1.085
17	0.026	1.443	0.073	1.265
17	0.048	1.513	0.138	1.465
17	0.091	1.580	0.260	1.656
17	0.146	1.650	0.418	1.856
17	0.191	1.700	0.545	2.001
17	0.244	1.754	0.696	2.154
17	0.312	1.815	0.891	2.330
17	0.388	1.876	1.109	2.503
17	0.517	1.930	1.476	2.659
17	0.626	1.992	1.780	2.834
17	0.751	1.058	2.145	3.023
17	0.890	1.114	2.543	3.183
17	1.031	1.170	2.945	3.343
17	1.152	1.226	3.292	3.503
17	1.262	1.270	3.605	3.654
17	1.403	1.338	4.008	3.823
17	1.541	1.400	4.403	4.001
17	1.706	1.460	4.875	4.170
17	1.873	1.510	5.353	4.339
17	2.029	1.571	5.797	4.488
17	2.192	1.619	6.262	4.626
17	2.370	1.667	6.771	4.764
17	2.534	1.708	7.240	4.881
17	2.683	1.747	7.667	4.993
17	2.851	1.795	8.147	5.128
17	3.000	1.842	8.598	5.262
17	3.278	1.929	9.365	5.510

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PLOTO NO.	Y (INCHES)	P (INCHES)	X/REYIT	R/REYIT
19	0.000	1.000	0.000	0.000
19	0.000	1.366	0.000	3.903
19	0.002	0.370	0.004	1.083
19	0.034	0.439	0.098	1.254
19	0.060	0.492	0.198	1.405
19	0.107	0.538	0.305	1.538
19	0.203	0.654	0.580	1.867
19	0.253	0.706	0.722	2.016
19	0.295	0.755	0.842	2.158
19	0.364	0.800	1.040	2.285
19	0.432	0.841	1.234	2.403
19	0.514	0.896	1.469	2.561
19	0.685	0.986	1.956	2.816
19	0.769	1.033	2.198	2.952
19	0.871	1.076	2.490	3.074
19	0.978	1.110	2.794	3.196
19	1.068	1.154	3.052	3.296
19	1.291	1.233	3.688	3.523
19	1.448	1.285	4.137	3.672
19	1.584	1.336	4.526	3.817
19	1.700	1.376	4.884	3.930
19	1.842	1.407	5.264	4.019
19	1.978	1.465	5.651	4.186
19	2.145	1.518	6.128	4.337
19	2.294	1.572	6.555	4.490
19	2.478	1.615	7.080	4.615
19	2.664	1.652	7.611	4.721
19	2.870	1.690	8.225	4.828
19	3.052	1.720	8.720	4.939
19	3.220	1.764	9.200	5.039
19	3.392	1.789	9.692	5.113

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
21	0.000	1.345	0.000	3.899
21	0.000	2.394	0.000	1.127
21	0.010	2.444	0.053	1.271
21	0.050	2.492	0.142	1.405
21	0.287	2.545	0.249	1.556
21	0.135	2.588	0.387	1.688
21	0.196	2.654	0.560	1.867
21	0.251	2.696	0.716	1.989
21	0.303	2.747	0.865	2.134
21	0.364	2.784	1.040	2.241
21	0.430	2.825	1.254	2.356
21	0.514	2.863	1.469	2.465
21	0.592	2.899	1.692	2.570
21	0.650	2.937	1.856	2.676
21	0.741	2.969	2.118	2.770
21	0.823	1.003	2.352	2.865
21	0.890	1.036	2.570	2.961
21	0.996	1.071	2.845	3.059
21	1.090	1.108	3.141	3.165
21	1.203	1.137	3.437	3.250
21	1.298	1.170	3.710	3.343
21	1.414	1.214	4.039	3.468
21	1.532	1.264	4.377	3.612
21	1.647	1.310	4.706	3.743
21	1.740	1.354	4.970	3.868
21	1.867	1.399	5.335	3.907
21	2.006	1.435	5.733	4.101
21	2.173	1.478	6.208	4.223
21	2.265	1.531	6.471	4.375
21	2.375	1.584	6.734	4.527

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
25	0.000	1.366	0.000	3.903
25	0.000	0.373	0.000	1.065
25	0.022	0.444	0.062	1.269
25	0.059	0.516	0.169	1.474
25	0.113	0.577	0.322	1.649
25	0.171	0.651	0.489	1.861
25	0.234	0.711	0.680	2.032
25	0.327	0.758	0.934	2.165
25	0.401	0.815	1.145	2.327
25	0.501	0.870	1.432	2.485
25	0.600	0.924	1.740	2.641
25	0.726	0.980	2.074	2.801
25	0.846	1.026	2.418	2.932
25	0.969	1.082	2.770	3.092
25	1.101	1.130	3.145	3.254
25	1.260	1.191	3.601	3.403
25	1.414	1.243	4.030	3.552
25	1.575	1.294	4.501	3.697
25	1.774	1.348	5.068	3.852
25	1.929	1.397	5.513	3.900
25	2.097	1.453	5.991	4.152
25	2.280	1.507	6.515	4.306
25	2.431	1.552	6.946	4.435
25	2.581	1.600	7.373	4.570

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VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/R EXIT	R/R EXIT
27	0.000	1.364	0.000	3.903
27	0.400	1.382	0.000	1.091
27	0.810	0.441	0.053	1.260
27	0.052	0.496	0.142	1.418
27	0.080	0.561	0.229	1.603
27	0.148	0.602	0.422	1.720
27	0.183	0.643	0.522	1.838
27	0.255	0.692	0.720	1.976
27	0.333	0.746	0.951	2.132
27	0.436	0.802	1.245	2.292
27	0.541	0.860	1.545	2.458
27	0.663	0.907	1.894	2.592
27	0.802	0.965	2.292	2.759
27	0.937	1.021	2.676	2.916
27	1.048	1.070	2.094	3.083
27	1.338	1.172	3.823	3.348
27	1.516	1.217	4.330	3.477
27	1.630	1.258	4.657	3.594
27	1.816	1.302	5.188	3.721
27	1.976	1.342	5.646	3.834
27	2.139	1.388	6.113	3.966
27	2.280	1.420	6.515	4.083
27	2.440	1.475	6.998	4.215

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
31	0.000	0.000	0.000	0.000
31	0.000	1.376	0.000	3.930
31	0.000	0.362	0.000	1.034
31	0.006	0.478	0.018	1.367
31	0.027	0.566	0.078	1.616
31	0.078	0.638	0.222	1.823
31	0.130	0.706	0.371	2.016
31	0.186	0.784	0.531	2.241
31	0.246	0.855	0.702	2.443
31	0.314	0.913	0.898	2.607
31	0.398	0.958	1.138	2.739
31	0.497	1.032	1.420	2.948
31	0.576	1.092	1.645	3.121
31	0.677	1.139	1.934	3.254
31	0.756	1.183	2.161	3.379
31	0.832	1.244	2.378	3.554
31	0.921	1.316	2.632	3.761
31	1.023	1.392	2.923	3.977
31	1.120	1.462	3.190	4.177
31	1.223	1.526	3.494	4.359

VISCIOUS PLUME BOUNDARY COORDINATES, SET 2

DEPTH FO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
34	0.000	0.350	0.000	1.000
34	0.022	0.470	0.057	1.370
34	0.077	0.543	0.220	1.552
34	0.142	0.600	0.405	1.715
34	0.203	0.670	0.580	1.915
34	0.270	0.725	0.797	2.072
34	0.356	0.780	1.017	2.230
34	0.454	0.829	1.297	2.370
34	0.549	0.860	1.570	2.482
34	0.665	0.935	1.900	2.672
34	0.911	1.032	2.602	2.950
34	1.071	1.073	3.060	3.065
34	1.196	1.118	3.417	3.195
34	1.320	1.152	3.772	3.292
34	1.525	1.191	4.357	3.402
34	1.687	1.232	4.820	3.520
34	1.927	1.277	5.220	3.650

VISCOUS FLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	X (INCHES)	Y/REXIT	X/REXIT
37	0.000	0.350	0.000	1.000
37	0.021	0.443	0.060	1.265
37	0.063	0.494	0.180	1.412
37	0.116	0.546	0.332	1.560
37	0.157	0.586	0.450	1.675
37	0.204	0.638	0.580	1.822
37	0.263	0.676	0.752	1.932
37	0.333	0.705	0.952	2.015
37	0.389	0.735	1.112	2.100
37	0.471	0.781	1.345	2.232
37	0.550	0.803	1.572	2.295
37	0.640	0.855	1.830	2.442
37	0.710	0.879	2.030	2.512
37	0.815	0.892	2.330	2.550
37	0.910	0.921	2.600	2.632
37	1.072	0.966	3.062	2.760
37	1.260	1.004	3.625	2.870
37	1.441	1.043	4.117	2.980
37	1.612	1.089	4.605	3.112
37	1.789	1.123	5.112	3.210
37	1.990	1.151	5.712	3.287
37	2.188	1.180	6.252	3.372
37	2.353	1.221	6.722	3.487
37	2.472	1.292	7.062	3.602
37	2.646	1.334	7.560	3.812
37	2.768	1.442	7.910	4.120

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
38	0.000	1.351	0.000	3.859
38	0.000	0.373	0.000	1.067
38	0.010	0.424	0.053	1.211
38	0.061	0.473	0.173	1.351
38	0.111	0.524	0.318	1.496
38	0.157	0.576	0.440	1.647
38	0.216	0.626	0.618	1.789
38	0.275	0.682	0.787	1.949
38	0.356	0.732	1.018	2.092
38	0.446	0.763	1.274	2.181
38	0.522	0.822	1.492	2.350
38	0.625	0.871	1.785	2.490
38	0.737	0.914	2.105	2.612
38	0.988	0.992	2.823	2.834
38	1.127	1.055	3.219	3.014
38	1.259	1.090	3.597	3.139
38	1.422	1.139	4.063	3.254
38	1.595	1.189	4.557	3.397
38	1.730	1.242	4.968	3.548
38	1.930	1.283	5.515	3.665
38	2.126	1.320	6.075	3.772
38	2.298	1.361	6.566	3.890
38	2.470	1.400	7.082	4.001
38	2.669	1.435	7.624	4.099
38	2.806	1.481	8.018	4.230
38	2.968	1.526	8.480	4.359
38				

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
43	0.000	0.351	0.000	1.000
43	0.000	0.407	0.000	1.162
43	0.144	0.425	0.125	1.215
43	0.114	0.450	0.315	1.285
43	0.198	0.475	0.565	1.357
43	0.284	0.489	0.812	1.397
43	0.367	0.503	1.047	1.437
43	0.512	0.518	1.462	1.480
43	0.645	0.541	1.842	1.545
43	0.764	0.556	2.182	1.587
43	0.887	0.577	2.535	1.647
43	1.009	0.591	2.882	1.687
43	1.129	0.610	3.225	1.742
43	1.259	0.626	3.597	1.787
43	1.543	0.657	4.410	1.877
43	1.643	0.660	4.695	1.885
43	1.829	0.667	5.225	1.905
43	2.007	0.678	5.735	1.937
43	2.188	0.692	6.252	1.977
43	2.382	0.700	6.805	2.000
43	2.540	0.703	7.282	2.007
43	2.706	0.700	7.732	2.000
43	2.874	0.690	8.212	1.997
43	2.981	0.696	8.517	1.987
43	3.111	0.688	8.887	1.965
43	3.271	0.682	9.345	1.947
43	3.397	0.677	9.705	1.935
43	3.534	0.675	10.097	1.927
43	3.645	0.677	10.415	1.935
43	3.763	0.674	10.752	1.925
43	3.893	0.670	11.122	1.915
43	4.034	0.663	11.515	1.895
43	4.187	0.660	11.962	1.885
43	4.318	0.657	12.337	1.877
43	4.475	0.653	12.785	1.865
43	4.655	0.647	13.320	1.847

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VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
44	0.000	0.000	0.000	0.000
44	0.000	1.366	0.000	3.903
44	0.000	2.391	0.000	1.118
44	0.013	2.495	0.038	1.414
44	0.031	2.565	0.080	1.614
44	0.054	2.626	0.153	1.787
44	0.091	2.705	0.260	2.014
44	0.128	2.774	0.367	2.212
44	0.169	2.840	0.482	2.401
44	0.209	2.900	0.598	2.599
44	0.240	2.980	0.685	2.801
44	0.277	3.045	0.791	2.985
44	0.321	3.109	0.916	3.168
44	0.364	3.171	1.040	3.345
44	0.418	3.217	1.194	3.477
44	0.454	3.274	1.298	3.641
44	0.514	3.331	1.469	3.803
44	0.557	3.400	1.592	4.001
44	0.585	3.445	1.672	4.128
44	0.626	3.500	1.780	4.286
44	0.669	3.565	1.912	4.472
44	0.713	3.635	2.035	4.670
44	0.738	3.667	2.100	4.764
44	0.791	3.715	2.261	4.899
44	0.840	3.777	2.401	5.077
44	0.903	3.830	2.581	5.228
44	0.953	3.895	2.723	5.415
44	1.008	3.957	2.881	5.593
44	1.043	4.004	2.979	5.726
44	1.084	4.076	3.096	5.931
44	1.127	4.134	3.221	6.097
44	1.183	4.195	3.379	6.271
44	1.228	4.231	3.512	6.373
44	1.277	4.318	3.648	6.622
44	1.310	4.384	3.768	6.811
44	1.394	4.446	3.983	6.989
44	1.472	4.514	4.206	7.194
44	1.532	4.564	4.377	7.324
44	1.591	4.624	4.546	7.498
44	1.662	4.684	4.748	7.669
44	1.709	4.745	4.884	7.842
44	1.765	4.807	5.044	8.020
44	1.837	4.868	5.248	8.196
44	1.905	4.936	5.442	8.389
44	1.967	5.006	5.610	8.560

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
46	0.000	1.355	0.000	3.872
46	0.000	1.420	0.000	1.225
46	0.016	1.520	0.047	1.485
46	0.044	1.589	0.124	1.683
46	0.060	1.641	0.171	1.832
46	0.081	1.700	0.231	2.001
46	0.110	1.739	0.313	2.112
46	0.135	1.776	0.387	2.216
46	0.162	1.819	0.462	2.338
46	0.195	1.874	0.558	2.498
46	0.234	1.935	0.660	2.672
46	0.261	1.983	0.747	2.810
46	0.303	1.020	0.865	2.914
46	0.332	1.065	0.940	3.043
46	0.373	1.116	1.067	3.188
46	0.410	1.172	1.196	3.350
46	0.468	1.232	1.336	3.521
46	0.501	1.312	1.432	3.748
46	0.564	1.370	1.612	3.939
46	0.641	1.436	1.832	4.103
46	0.692	1.491	1.976	4.261
46	0.751	1.553	2.145	4.437
46	0.812	1.614	2.314	4.612
46	0.858	1.677	2.452	4.792
46	0.905	1.733	2.585	4.953
46	0.953	1.795	2.723	5.128
46	1.012	1.855	2.892	5.299
46	1.090	1.921	3.114	5.488
46	1.145	1.989	3.272	5.682
46	1.227	2.055	3.505	5.871
46	1.283	2.141	3.665	6.117
46	1.364	2.212	3.897	6.320
46	1.446	2.278	4.132	6.509
46	1.536	2.346	4.388	6.704
46	1.628	2.410	4.652	6.886
46	1.705	2.484	4.873	7.108
46	1.788	2.571	5.106	7.344
46	1.870	2.630	5.346	7.540
46	1.943	2.698	5.550	7.709
46	2.024	2.782	5.782	7.949
46	2.111	2.847	6.031	8.133
46	2.210	2.910	6.315	8.340
46	2.304	2.988	6.582	8.536

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
48	0.000	1.355	0.000	3.872
48	0.000	0.400	0.000	1.165
48	0.000	0.520	0.027	1.512
48	0.023	0.585	0.064	1.672
48	0.040	0.641	0.116	1.832
48	0.058	0.696	0.164	1.989
48	0.081	0.734	0.231	2.098
48	0.097	0.780	0.278	2.230
48	0.124	0.825	0.356	2.356
48	0.138	0.874	0.396	2.496
48	0.165	0.927	0.471	2.650
48	0.206	0.983	0.580	2.807
48	0.233	1.020	0.667	2.941
48	0.265	1.070	0.756	3.083
48	0.303	1.138	0.865	3.252
48	0.340	1.207	0.998	3.448
48	0.405	1.288	1.156	3.681
48	0.440	1.365	1.283	3.903
48	0.505	1.446	1.443	4.132
48	0.561	1.516	1.603	4.332
48	0.610	1.580	1.760	4.539
48	0.660	1.656	1.912	4.730
48	0.720	1.730	2.056	4.968
48	0.803	1.808	2.294	5.166
48	0.853	1.873	2.436	5.353
48	0.927	1.947	2.647	5.562
48	0.990	2.008	2.827	5.737
48	1.047	2.057	2.992	5.877
48	1.096	2.110	3.132	6.055
48	1.156	2.190	3.303	6.257
48	1.227	2.253	3.505	6.437
48	1.301	2.341	3.717	6.689
48	1.380	2.412	3.943	6.891
48	1.466	2.483	4.188	7.095
48	1.545	2.556	4.415	7.302
48	1.647	2.636	4.706	7.531
48	1.728	2.714	4.937	7.753
48	1.800	2.793	5.141	7.980
48	1.880	2.877	5.370	8.220
48	1.973	2.954	5.637	8.429
48	2.080	3.017	5.968	8.620
48	2.168	3.080	6.195	8.800

VISCOUS PLUME BOUNDARY COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
50	0.000	1.358	0.000	3.879
50	0.000	0.394	0.000	1.125
50	0.037	0.612	0.104	1.749
50	0.058	0.671	0.167	1.918
50	0.090	0.746	0.282	2.132
50	0.134	0.821	0.382	2.345
50	0.183	0.874	0.522	2.498
50	0.301	1.004	0.860	2.867
50	0.352	1.073	1.005	3.065
50	0.432	1.213	1.234	3.465
50	0.538	1.365	1.536	3.901
50	0.598	1.492	1.707	4.263
50	0.693	1.587	1.981	4.535
50	0.755	1.772	2.158	5.064
50	0.878	1.891	2.507	5.404
50	0.976	1.966	2.790	5.617
50	1.067	2.053	3.048	5.866
50	1.148	2.109	3.279	6.026
50	1.218	2.187	3.479	6.248
50	1.307	2.247	3.734	6.420
50	1.383	2.314	3.952	6.611
50	1.460	2.380	4.170	6.826
50	1.540	2.466	4.426	7.046
50	1.638	2.527	4.679	7.220
50	1.710	2.598	4.913	7.422
50	1.808	2.660	5.164	7.624
50	1.894	2.753	5.413	7.867
50	1.993	2.837	5.695	8.107
50	2.091	2.905	5.975	8.300

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VISCOS PLUME BOUNDARY COORDINATES, SET 3

PLATO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
1	0.000	0.000	0.000	0.000
1	0.000	1.363	0.000	3.894
1	0.000	1.340	0.000	0.976
1	0.020	1.434	0.080	1.240
1	0.071	1.527	0.202	1.505
1	0.218	1.655	0.622	1.956
1	0.250	1.744	0.740	2.125
1	0.363	1.797	1.038	2.276
1	0.484	1.850	1.383	2.454
1	0.632	1.933	1.905	2.665
1	0.803	1.015	2.294	2.901
1	0.961	1.088	2.745	3.110
1	1.136	1.154	3.245	3.308
1	1.527	1.313	4.363	3.752
1	1.690	1.376	4.828	3.930
1	1.843	1.428	5.266	4.079
1	2.007	1.478	5.735	4.223
1	2.176	1.540	6.217	4.426
1	2.374	1.628	6.784	4.650
1	2.574	1.706	7.355	4.875
1	2.757	1.777	7.878	5.077
1	2.969	1.824	8.482	5.224
1	3.180	1.883	9.111	5.379
1	3.388	1.944	9.681	5.555
1	3.536	1.993	10.103	5.695

6 VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
3	0.000	0.000	0.000	0.000
3	0.000	1.351	0.000	3.859
3	0.000	0.366	0.000	1.747
3	0.037	0.457	0.107	1.307
3	0.123	0.541	0.293	1.545
3	0.202	0.644	0.576	1.841
3	0.310	0.727	0.887	2.078
3	0.435	0.810	1.243	2.314
3	0.575	0.871	1.643	2.487
3	0.721	0.943	2.061	2.694
3	0.874	1.004	2.498	2.867
3	1.228	1.120	3.512	3.201
3	1.382	1.192	3.040	3.405
3	1.562	1.257	4.463	3.592
3	1.751	1.322	5.004	3.777
3	1.960	1.400	5.626	4.010
3	2.287	1.504	6.533	4.297
3	2.511	1.544	7.173	4.399

VISCOUS PLANE BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
5	0.000	0.000	0.000	0.000
5	0.000	1.372	0.000	3.919
5	0.000	0.370	0.000	1.158
5	0.029	0.455	0.082	1.300
5	0.075	0.543	0.213	1.552
5	0.152	0.617	0.436	1.763
5	0.257	0.713	0.734	2.036
5	0.367	0.787	1.040	2.250
5	0.513	0.871	1.467	2.487
5	0.648	0.958	1.852	2.736
5	0.835	1.030	2.385	2.970
5	1.012	1.090	2.892	3.141
5	1.190	1.170	3.425	3.370
5	1.414	1.262	4.030	3.605
5	1.641	1.347	4.650	3.850
5	1.873	1.432	5.353	4.090

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	X (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
7	0.000	0.000	0.000	0.000
7	0.000	1.351	0.000	3.859
7	0.000	1.349	0.000	0.998
7	0.055	0.409	0.158	1.169
7	0.142	0.492	0.405	1.405
7	0.245	0.560	0.700	1.627
7	0.360	0.620	1.020	1.796
7	0.407	0.706	1.420	2.018
7	0.654	0.785	1.860	2.243
7	0.816	0.840	2.332	2.401
7	0.973	0.906	2.781	2.587
7	1.136	0.971	3.245	2.772
7	1.300	1.017	3.714	2.905
7	1.446	1.057	4.132	3.019
7	1.600	1.090	4.571	3.139
7	1.957	1.161	5.590	3.317
7	2.112	1.188	6.035	3.394
7	2.230	1.204	6.397	3.441

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
9	0.000	0.000	0.000	0.000
9	0.002	1.366	0.002	3.903
9	0.005	0.320	0.005	0.940
9	0.065	0.365	0.187	1.043
9	0.145	0.412	0.416	1.176
9	0.237	0.452	0.676	1.291
9	0.432	0.557	1.234	1.592
9	0.577	0.597	1.649	1.705
9	0.722	0.635	2.063	1.814
9	1.022	0.672	2.910	1.936
9	1.176	0.703	3.361	2.007
9	1.391	0.731	3.974	2.087
9	1.553	0.721	4.437	2.061

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
11	0.000	0.000	0.000	0.000
11	0.000	1.354	0.000	3.881
11	0.000	0.348	0.000	0.904
11	0.045	0.383	0.120	1.094
11	0.103	0.422	0.296	1.207
11	0.193	0.474	0.551	1.354
11	0.282	0.524	0.807	1.487
11	0.533	0.616	1.523	1.761
11	0.671	0.657	1.016	1.876
11	0.797	0.685	2.276	1.956
11	1.164	0.750	3.325	2.170
11	1.342	0.780	3.834	2.227

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VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
13	0.000	0.000	0.000	0.000
13	0.000	1.340	0.000	3.854
13	0.000	0.356	0.000	1.018
13	0.031	0.402	0.080	1.149
13	0.077	0.455	0.220	1.300
13	0.137	0.505	0.391	1.443
13	0.214	0.572	0.611	1.634
13	0.301	0.643	0.862	1.836
13	0.394	0.717	1.127	2.049
13	0.520	0.780	1.485	2.227
13	0.651	0.853	1.861	2.438
13	0.802	0.927	2.292	2.647
13	0.964	1.004	2.754	2.867
13	1.095	1.060	3.130	3.030
13	1.251	1.110	3.574	3.196
13	1.410	1.170	4.054	3.368
13	1.770	1.290	5.057	3.710
13	1.933	1.337	5.522	3.819
13	2.082	1.380	5.940	3.943
13	2.451	1.465	7.004	4.186
13	2.630	1.505	7.513	4.209
13	2.823	1.547	8.065	4.421
13	3.044	1.580	8.690	4.541
13	3.295	1.620	9.414	4.650
13	3.534	1.663	10.090	4.752

VISCOUS PLUME BOUNDARY COORDINATES, SET 3.

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
15	0.222	0.000	2.000	0.000
15	0.302	1.347	0.002	3.848
15	0.200	0.353	0.000	1.009
15	0.236	0.385	0.102	1.100
15	0.090	0.426	0.258	1.216
15	0.153	0.474	0.438	1.354
15	0.242	0.525	0.691	1.500
15	0.300	0.571	0.858	1.632
15	0.363	0.617	1.038	1.763
15	0.454	0.665	1.296	1.901
15	0.541	0.709	1.545	2.025
15	0.638	0.762	1.823	2.176
15	0.744	0.819	2.125	2.341
15	0.884	0.877	2.525	2.505
15	1.021	0.920	2.916	2.630
15	1.150	0.955	3.285	2.727
15	1.281	0.995	3.650	2.843
15	1.400	1.036	4.024	2.959
15	1.653	1.110	4.724	3.172
15	1.800	1.144	5.144	3.270
15	1.941	1.176	5.546	3.359
15	2.080	1.203	5.944	3.437
15	2.346	1.256	6.702	3.588
15	2.524	1.275	7.211	3.643

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
19	0.000	0.000	0.000	0.000
19	0.000	1.369	0.000	3.912
19	0.000	0.353	0.000	1.009
19	0.044	0.390	0.124	1.140
19	0.137	0.451	0.391	1.289
19	0.228	0.489	0.651	1.398
19	0.312	0.514	0.891	1.469
19	0.405	0.548	1.158	1.567
19	0.519	0.573	1.483	1.638
19	0.650	0.604	1.856	1.725
19	0.760	0.622	2.172	1.778
19	1.006	0.661	2.874	1.887
19	1.278	0.663	3.281	1.894
19	1.260	0.660	3.601	1.912
19	1.404	0.691	4.012	1.974

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
21	0.000	0.000	0.000	0.000
21	0.000	1.358	0.000	3.879
21	0.000	0.356	0.000	1.016
21	0.047	0.410	0.134	1.171
21	0.090	0.457	0.258	1.305
21	0.152	0.500	0.436	1.454
21	0.227	0.560	0.649	1.600
21	0.320	0.611	0.914	1.745
21	0.524	0.694	1.496	1.983
21	0.629	0.736	1.796	2.103
21	0.729	0.790	2.083	2.258
21	0.885	0.834	2.527	2.383
21	1.065	0.887	3.043	2.534
21	1.198	0.934	3.423	2.667
21	1.474	1.014	4.212	2.896
21	1.637	1.036	4.677	2.961
21	1.768	1.060	5.053	3.028
21	1.915	1.080	5.470	3.085
21	2.060	1.102	5.886	3.148
21	2.231	1.126	6.375	3.216
21	2.353	1.144	6.722	3.270

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VISCOUS FLAME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
23	0.000	0.000	0.000	0.000
23	0.000	1.372	0.000	3.921
23	0.000	0.342	0.000	0.978
23	0.041	0.386	0.112	1.103
23	0.110	0.432	0.313	1.229
23	0.175	0.462	0.500	1.320
23	0.240	0.484	0.711	1.383
23	0.318	0.513	0.909	1.465
23	0.410	0.541	1.171	1.547
23	0.496	0.566	1.412	1.618
23	0.591	0.582	1.680	1.680
23	0.720	0.595	2.001	1.700
23	0.803	0.604	2.294	1.725
23	0.986	0.616	2.816	1.761
23	1.130	0.620	3.228	1.798
23	1.255	0.632	3.585	1.823
23	1.357	0.644	3.877	1.841

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
25	0.000	0.000	0.000	0.000
25	0.000	1.361	0.002	3.890
25	0.000	0.338	0.000	0.967
25	0.037	0.380	0.107	1.111
25	0.093	0.439	0.267	1.254
25	0.167	0.476	0.478	1.360
25	0.242	0.535	0.691	1.529
25	0.310	0.581	0.887	1.660
25	0.385	0.620	1.100	1.796
25	0.470	0.675	1.343	1.927
25	0.566	0.728	1.616	2.081
25	0.772	0.828	2.205	2.365
25	0.883	0.868	2.523	2.481
25	1.011	0.989	2.890	2.599
25	1.148	0.955	3.281	2.730
25	1.492	1.045	4.257	2.985
25	1.883	1.163	5.379	3.323
25	2.455	1.247	7.015	3.563
25	2.763	1.270	7.893	3.628
25	2.960	1.288	8.456	3.681
25	3.135	1.284	8.956	3.670
25	3.308	1.282	9.452	3.663
25	3.451	1.277	9.861	3.648

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PLOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
27	0.000	0.000	0.000	0.000
27	0.000	1.362	0.002	3.886
27	0.000	0.341	0.000	0.974
27	0.040	0.391	0.116	1.116
27	0.112	0.456	0.320	1.303
27	0.177	0.515	0.507	1.472
27	0.262	0.574	0.749	1.640
27	0.352	0.636	1.007	1.818
27	0.502	0.735	1.434	2.101
27	0.641	0.817	1.832	2.334
27	0.772	0.877	2.205	2.505
27	0.897	0.935	2.563	2.672
27	1.030	0.983	2.943	2.807
27	1.177	1.038	3.363	2.965
27	1.378	1.103	3.937	3.152
27	1.544	1.155	4.412	3.301
27	1.693	1.193	4.837	3.410
27	1.858	1.244	5.308	3.554
27	2.036	1.283	5.817	3.665
27	2.212	1.321	6.320	3.774
27	2.388	1.370	6.822	3.914
27	2.593	1.404	7.409	4.010
27	2.781	1.424	7.947	4.068
27	2.954	1.467	8.440	4.190
27	3.166	1.486	9.045	4.246
27	3.352	1.505	9.576	4.299
27	3.551	1.516	10.145	4.332
27	3.731	1.530	10.661	4.370

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
29	0.000	1.358	0.002	3.879
29	0.000	0.372	0.000	1.063
29	0.016	0.420	0.047	1.225
29	0.047	0.499	0.136	1.425
29	0.090	0.563	0.258	1.609
29	0.165	0.643	0.471	1.836
29	0.230	0.725	0.658	2.072
29	0.296	0.801	0.845	2.290
29	0.366	0.879	1.045	2.512
29	0.440	0.962	1.260	2.750
29	0.527	1.046	1.505	2.990
29	0.623	1.137	1.781	3.248
29	0.713	1.215	2.038	3.472
29	0.813	1.296	2.323	3.703
29	0.916	1.380	2.616	3.943
29	1.018	1.440	2.910	4.139
29	1.102	1.517	3.150	4.335
29	1.200	1.586	3.430	4.532
29	1.302	1.660	3.710	4.744
29	1.426	1.768	4.074	5.053
29	1.547	1.831	4.421	5.230
29	1.663	1.890	4.750	5.399
29	1.780	1.950	5.086	5.570
29	1.893	2.017	5.408	5.764
29	1.980	2.074	5.682	5.926
29	2.101	2.177	6.002	6.220
29	2.222	2.242	6.348	6.406
29	2.332	2.304	6.662	6.584
29	2.440	2.347	6.971	6.706
29	2.550	2.410	7.284	6.886
29	2.688	2.463	7.680	7.038

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VISCOUS PLUME BOUNDARY COORDINATES. SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
31	0.000	0.000	0.000	0.000
31	0.000	1.359	0.000	3.883
31	0.000	2.303	0.000	1.123
31	0.023	4.468	0.064	1.338
31	0.251	4.546	0.147	1.560
31	0.290	0.615	0.250	1.758
31	0.120	2.671	0.360	1.918
31	0.175	3.720	0.502	2.056
31	0.211	0.793	0.622	2.265
31	0.257	0.854	0.734	2.441
31	0.285	0.038	0.814	2.681
31	0.362	1.012	1.034	2.892
31	0.427	1.088	1.220	3.110
31	0.496	1.155	1.414	3.301
31	0.575	1.248	1.643	3.565
31	0.648	1.337	1.852	3.819
31	0.738	1.418	2.139	4.152
31	0.826	1.497	2.361	4.277
31	0.904	1.572	2.583	4.486
31	0.972	1.648	2.779	4.708
31	1.050	1.726	3.001	4.933
31	1.150	1.804	3.285	5.155
31	1.212	1.879	3.463	5.368
31	1.339	1.964	3.739	5.610
31	1.401	2.031	4.003	5.802
31	1.486	2.109	4.246	6.026
31	1.550	2.184	4.455	6.240
31	1.647	2.261	4.704	6.460
31	1.744	2.326	4.984	6.646
31	1.835	2.408	5.241	6.880
31	1.943	2.470	5.553	7.084
31	2.040	2.554	5.828	7.298
31	2.133	2.629	6.095	7.511
31	2.226	2.691	6.362	7.689
31	2.308	2.766	6.593	7.902
31	2.375	2.824	6.784	8.069

VISCOUS PLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
33	0.000	0.000	0.000	0.000
33	0.000	1.351	0.000	3.861
33	0.000	0.406	0.000	1.160
33	0.009	0.476	0.027	1.360
33	0.023	0.529	0.064	1.512
33	0.047	0.583	0.136	1.665
33	0.081	0.635	0.231	1.814
33	0.103	0.694	0.296	1.983
33	0.128	0.753	0.367	2.152
33	0.166	0.813	0.473	2.323
33	0.194	0.867	0.553	2.478
33	0.233	0.929	0.667	2.630
33	0.263	0.980	0.751	2.825
33	0.312	1.048	0.891	2.994
33	0.345	1.116	0.987	3.190
33	0.377	1.170	1.078	3.343
33	0.414	1.236	1.183	3.532
33	0.451	1.295	1.280	3.609
33	0.512	1.358	1.463	3.879
33	0.573	1.416	1.638	4.046
33	0.617	1.504	1.763	4.297
33	0.685	1.577	1.956	4.506
33	0.738	1.664	2.107	4.755
33	0.807	1.736	2.305	4.959
33	0.868	1.793	2.481	5.121
33	0.907	1.842	2.592	5.264
33	0.956	1.901	2.732	5.430
33	1.005	1.950	2.872	5.573
33	1.043	2.005	2.070	5.728
33	1.095	2.057	3.137	5.877
33	1.155	2.122	3.301	6.064
33	1.220	2.194	3.485	6.268
33	1.295	2.253	3.690	6.437
33	1.357	2.310	3.877	6.600
33	1.422	2.367	4.063	6.764
33	1.502	2.437	4.292	6.962
33	1.563	2.504	4.466	7.155
33	1.631	2.558	4.661	7.309
33	1.699	2.616	4.855	7.475
33	1.762	2.667	5.035	7.620
33	1.828	2.729	5.224	7.798

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MICROPLUME BOUNDARY COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
36	0.000	0.350	0.000	1.000
36	0.227	0.810	0.447	2.315
36	0.535	1.141	1.527	3.260
36	0.783	1.390	2.237	3.990
36	1.053	1.646	3.007	4.702
36	1.420	1.877	4.000	5.362
36	1.720	2.066	4.937	5.902
36	2.044	2.326	5.840	6.645
36	2.393	2.475	6.837	7.072
36	2.740	2.647	7.827	7.562
36	3.040	2.810	8.707	8.052
36	3.380	2.053	9.480	8.437

VISCOUS PLUME BOUNDARY COORDINATES. SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
56	0.000	0.353	0.000	1.000
56	0.197	0.474	0.562	1.725
56	0.454	0.737	1.297	2.105
56	0.764	0.867	2.190	2.305
56	1.138	0.850	3.252	2.455
56	1.552	0.808	4.435	2.565
56	1.964	0.913	5.612	2.627
56	2.443	0.890	6.980	2.570
56	2.831	0.858	8.090	2.452
56	3.248	0.823	9.280	2.352
56	3.605	0.757	10.300	2.162
56	3.958	0.716	11.310	2.045
56	4.264	0.629	12.152	1.797

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

POINT NO.	Y (INCHES)	W (INCHES)	X/REFIT	W/REFIT
5A	0.000	0.000	0.000	0.000
5B	0.000	1.367	0.000	3.906
5C	0.000	0.352	0.000	1.005
5D	0.042	1.466	0.127	1.331
5E	0.134	2.608	0.382	1.736
5F	0.242	0.723	0.691	2.265
5G	0.364	0.833	1.040	2.381
5H	0.620	3.079	1.796	2.794
5I	0.818	1.046	2.338	2.900
5J	1.015	1.140	2.890	3.256
5K	1.170	1.225	3.372	3.501
5L	1.531	1.395	4.375	3.986
5M	1.736	1.400	4.961	4.257
5N	1.957	1.575	5.593	4.409
5O	2.433	1.733	6.051	4.953

VISCOUS FLUME BOUNDARY COORDINATES. SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
40	0.000	0.000	0.000	0.000
40	0.000	1.355	0.000	3.872
40	0.000	1.364	0.000	1.040
40	0.137	0.466	0.107	1.331
40	0.115	0.594	0.329	1.698
40	0.233	0.714	0.667	2.041
40	0.380	0.824	1.111	2.354
40	0.556	0.926	1.589	2.645
40	0.737	1.015	2.105	2.901
40	0.921	1.104	2.632	3.154
40	1.196	1.211	3.132	3.441
40	1.312	1.324	3.750	3.783
40	1.540	1.435	4.401	4.099
40	1.799	1.530	5.139	4.372
40	2.032	1.633	5.806	4.666
40	2.262	1.724	6.462	4.926

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
42	0.000	0.000	0.000	0.000
42	0.000	1.360	0.000	3.886
42	0.000	0.370	0.000	1.083
42	0.032	0.464	0.091	1.325
42	0.117	0.619	0.336	1.767
42	0.240	0.740	0.685	2.114
42	0.359	0.824	1.025	2.354
42	0.517	0.914	1.476	2.612
42	0.689	1.004	1.967	2.867
42	0.871	1.103	2.487	3.152
42	1.068	1.200	3.052	3.428
42	1.200	1.315	3.685	3.757
42	1.526	1.433	4.350	4.095
42	1.800	1.558	5.168	4.452
42	2.030	1.655	5.826	4.728
42	2.500	1.873	7.160	5.353
42	2.746	1.960	7.844	5.626
42	3.207	2.081	8.591	5.946
42	3.212	2.185	9.178	6.242

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
72	0.000	0.000	0.000	0.000
72	0.000	1.355	0.000	3.872
72	0.000	0.384	0.000	1.096
72	0.240	0.489	0.116	1.396
72	0.278	0.572	0.222	1.634
72	0.153	0.663	0.438	1.894
72	0.263	0.752	0.751	2.143
72	0.393	0.820	1.123	2.370
72	0.556	0.916	1.580	2.616
72	0.708	0.993	2.023	2.836
72	0.910	1.104	2.625	3.154
72	1.095	1.193	3.130	3.408
72	1.284	1.270	3.670	3.654
72	1.701	1.448	4.861	4.115
72	1.891	1.519	5.402	4.341
72	2.292	1.593	5.977	4.552
72	2.297	1.671	6.564	4.775
72	2.497	1.730	7.133	4.944
72	2.648	1.780	7.567	5.086

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
74	0.000	0.000	0.000	0.000
74	0.000	1.365	0.000	3.971
74	0.000	0.383	0.000	1.094
74	0.074	0.485	0.222	1.387
74	0.150	0.573	0.453	1.638
74	0.258	0.660	0.738	1.885
74	0.377	0.722	1.074	2.063
74	0.531	0.790	1.516	2.258
74	0.803	0.920	2.294	2.627
74	1.030	1.076	2.943	2.700
74	1.192	1.230	3.405	2.968
74	1.568	1.134	4.470	3.236
74	1.733	1.183	4.050	3.379
74	1.911	1.224	5.450	3.497
74	2.056	1.256	5.875	3.590

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
76	0.000	0.000	0.000	0.000
76	0.000	1.361	0.000	3.890
76	0.000	0.373	0.000	1.065
76	0.037	0.454	0.104	1.298
76	0.070	0.520	0.200	1.485
76	0.133	0.591	0.380	1.689
76	0.220	0.657	0.620	1.876
76	0.314	0.735	0.896	2.101
76	0.444	0.815	1.269	2.330
76	0.572	0.880	1.634	2.541
76	0.884	1.016	2.532	2.903
76	1.023	1.076	2.923	3.074
76	1.195	1.130	3.414	3.228
76	1.350	1.195	3.883	3.414
76	1.677	1.320	4.790	3.772
76	1.847	1.372	5.277	3.921
76	1.985	1.425	5.673	4.072

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VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	X (INCHES)	Y/REYIT	X/REYIT
#2	0.200	0.000	0.000	0.000
#2	0.200	1.357	0.000	3.877
#2	0.200	0.368	0.000	1.051
#2	0.220	0.443	0.080	1.267
#2	0.254	0.513	0.156	1.467
#2	0.290	0.598	0.282	1.707
#2	0.170	0.691	0.485	1.974
#2	0.230	0.787	0.656	2.247
#2	0.324	0.885	0.925	2.530
#2	0.436	0.996	1.245	2.845
#2	0.550	1.092	1.572	3.121
#2	0.647	1.193	1.849	3.408
#2	0.867	1.351	2.478	3.861
#2	0.983	1.425	2.807	4.270
#2	1.110	1.495	3.172	4.270
#2	1.207	1.593	3.448	4.550
#2	1.341	1.678	3.832	4.795
#2	1.475	1.761	4.215	5.033

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
14	0.700	0.827	0.820	0.800
14	0.800	1.372	0.800	3.921
14	0.800	0.377	0.820	1.076
14	0.823	0.445	0.864	1.271
14	0.888	0.537	0.251	1.534
14	0.178	0.610	0.500	1.769
14	0.263	0.706	0.751	2.216
14	0.358	0.785	1.023	2.243
14	0.461	0.861	1.310	2.461
14	0.582	0.916	1.663	2.619
14	0.706	0.970	2.018	2.779
14	0.835	1.017	2.385	2.905
14	0.961	1.073	2.745	3.065
14	1.102	1.127	3.140	3.219
14	1.240	1.183	3.560	3.379
14	1.380	1.230	3.960	3.514
14	1.520	1.301	4.360	3.717

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
06	0.000	0.000	0.000	0.000
06	0.000	1.350	0.000	3.879
06	0.000	0.384	0.000	1.096
06	0.033	0.483	0.093	1.380
06	0.076	0.566	0.210	1.618
06	0.132	0.643	0.370	1.836
06	0.217	0.701	0.620	2.003
06	0.283	0.760	0.809	2.198
06	0.357	0.833	1.020	2.381
06	0.439	0.880	1.254	2.536
06	0.531	0.930	1.510	2.681
06	0.635	0.997	1.814	2.850
06	0.774	1.046	2.212	2.988
06	0.870	1.090	2.507	3.136
06	1.101	1.211	3.145	3.459
06	1.235	1.273	3.520	3.637
06	1.376	1.336	3.930	3.817
06	1.501	1.411	4.280	4.030
06	1.631	1.473	4.650	4.208

VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PLUME NO.	Y (INCHES)	R (INCHES)	V/REF IT	R/REF IT
18	2.000	1.363	0.000	0.000
18	2.000	1.363	0.000	3.894
18	2.000	2.386	0.000	1.103
18	2.132	2.461	0.100	1.316
18	2.123	2.547	0.294	1.563
18	2.196	2.635	0.560	1.814
18	2.285	2.720	0.814	2.056
18	2.387	2.797	1.105	2.276
18	2.515	2.861	1.472	2.461
18	2.642	2.923	1.834	2.636
18	2.797	2.984	2.276	2.812
18	2.102	2.117	3.140	3.192
18	1.330	1.155	3.824	3.385
18	1.530	1.245	4.370	3.557
18	1.750	1.310	4.090	3.768

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VISCOUS PLUME BOUNDARY COORDINATES, SET 4

PLATO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
00	0.000	1.000	0.000	0.000
02	0.000	1.362	0.000	3.892
00	0.000	1.364	0.000	1.040
00	0.031	1.424	0.089	1.216
00	0.068	1.480	0.196	1.372
00	0.137	1.532	0.391	1.520
00	0.210	1.600	0.625	1.714
00	0.308	1.673	0.880	1.923
00	0.390	1.745	1.140	2.129
00	0.423	1.802	1.494	2.292
00	0.652	1.852	1.863	2.434
00	0.800	1.895	2.285	2.559
00	0.935	1.936	2.672	2.674
00	1.093	1.987	3.123	2.821
00	1.252	1.027	3.577	2.934
02	1.405	1.102	4.586	3.150
07	1.790	1.168	5.130	3.337
00	1.064	1.217	5.612	3.477
00	2.141	1.287	6.117	3.677
00	2.315	1.372	6.615	3.919
00	2.465	1.450	7.042	4.168

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
2	0.000	1.358	0.000	3.881
2	0.000	0.457	0.000	1.307
2	0.149	0.677	0.427	1.934
2	0.520	0.887	1.485	2.534
2	0.962	1.143	2.747	3.265
2	1.519	1.411	4.339	4.032
2	1.971	1.676	5.633	4.788
2	2.465	1.918	7.044	5.479
2	3.428	2.321	9.794	6.631
2	3.950	2.537	11.312	7.249
2	4.330	2.740	12.397	7.829
2	4.771	2.926	13.633	8.360
2	5.487	3.260	15.678	9.314

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
4	0.000	1.366	0.000	3.903
4	0.000	0.478	0.000	1.367
4	0.113	0.640	0.322	1.827
4	0.352	0.814	1.007	2.325
4	0.641	0.963	1.832	2.752
4	0.980	1.123	2.799	3.210
4	1.313	1.295	3.752	3.701
4	2.020	1.631	5.771	4.659
4	2.395	1.811	6.844	5.175
4	2.754	1.095	7.860	5.699
4	3.151	2.196	9.003	6.275
4	3.485	2.305	9.954	6.586
4	3.930	2.470	11.232	7.082
4	4.335	2.648	12.386	7.564
4	4.740	2.847	13.542	8.136
4	5.151	2.081	14.718	8.518
4	5.545	3.143	15.842	8.980

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	X (INCHES)	R (INCHES)	X/PEVIT	R/REFIT
6	0.000	1.350	0.000	3.857
6	0.000	0.460	0.000	1.314
6	0.145	0.639	0.416	1.825
6	0.380	0.766	1.065	2.187
6	0.685	0.862	1.056	2.463
6	1.021	1.039	2.916	2.970
6	1.376	1.232	3.930	3.521
6	1.701	1.396	4.861	3.988
6	2.041	1.568	5.831	4.479
6	2.421	1.759	6.918	5.026
6	2.785	1.902	7.958	5.435
6	3.080	2.056	8.827	5.875
6	3.555	2.222	10.156	6.348
6	3.868	2.381	11.752	6.804
6	4.222	2.543	12.963	7.264
6	4.543	2.697	12.979	7.707
6	5.306	2.981	15.160	8.518

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VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	X (INCHES)	R (INCHES)	X/REYIT	R/REYIT
8	0.000	1.379	0.000	3.939
8	0.000	2.457	0.000	1.305
8	0.136	0.635	0.389	1.814
8	0.367	0.790	1.049	2.258
8	0.706	0.955	2.018	2.730
8	1.079	1.104	3.083	3.154
8	1.475	1.285	4.215	3.672
8	1.897	1.474	5.410	4.212
8	2.728	1.859	7.796	5.310
8	3.165	2.007	9.043	5.735
8	3.540	2.147	10.141	6.135
8	3.946	2.301	11.274	6.573
8	4.320	2.435	12.344	6.958
8	4.612	2.555	13.177	7.300
8	4.960	2.689	14.171	7.682
8	5.203	2.797	14.866	7.991

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
10	0.000	1.368	0.000	3.908
10	0.000	1.458	0.000	1.309
10	0.130	1.707	0.371	2.021
10	0.441	2.002	1.260	2.576
10	0.844	1.080	2.412	3.112
10	1.274	1.322	3.639	3.772
10	2.110	1.750	6.028	4.999
10	2.509	1.953	7.169	5.579
10	2.928	2.120	8.365	6.084
10	3.281	2.293	9.374	6.551
10	3.620	2.478	10.376	7.080
10	3.952	2.590	11.292	7.427
10	4.335	2.721	12.386	7.776
10	4.763	2.898	13.628	8.280
10	5.132	3.040	14.662	8.687
10	5.556	3.206	15.873	9.160

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
15	0.780	1.360	0.000	3.910
15	0.780	0.473	0.000	1.351
15	0.121	0.697	0.347	1.992
15	0.396	0.874	1.131	2.496
15	0.725	1.064	2.072	3.041
15	1.086	1.267	3.103	3.619
15	1.463	1.435	4.170	4.099
15	1.831	1.643	5.233	4.695
15	2.153	1.798	6.151	5.137
15	2.514	1.967	7.184	5.619
15	2.888	2.147	8.251	6.133
15	3.650	2.530	10.454	7.253
15	4.252	2.685	11.577	7.671
15	4.453	2.853	12.724	8.151
15	4.838	2.994	13.822	8.554
15	5.268	3.177	15.051	9.076
15	5.608	3.332	16.022	9.514

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	X (INCHES)	X/REXIT	W/REXIT
17	2.000	1.354	0.002	3.868
17	2.000	1.434	0.000	1.240
17	2.171	1.664	3.480	1.896
17	2.470	2.091	1.360	2.832
17	2.463	1.309	2.465	3.739
17	1.220	1.557	3.485	4.448
17	1.665	1.783	4.757	5.095
17	2.081	1.992	5.046	5.693
17	2.543	2.192	7.264	6.262
17	2.977	2.314	8.507	6.611
17	3.372	2.431	9.634	6.946

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
22	0.000	0.350	0.000	1.000
22	0.140	0.723	0.400	2.065
22	0.485	1.031	1.385	2.945
22	0.786	1.283	2.245	3.665
22	1.158	1.542	3.310	4.405
22	2.624	2.224	7.497	6.355
22	3.118	2.391	8.007	6.832
22	3.554	2.486	10.155	7.102
22	4.043	2.581	11.552	7.375
22	4.398	2.636	12.565	7.532

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
24	0.000	1.330	0.000	3.826
24	0.000	0.424	0.000	1.211
24	0.096	0.622	0.273	1.778
24	0.325	0.828	0.020	2.365
24	0.633	1.030	1.809	2.970
24	1.005	1.270	2.872	3.628
24	1.370	1.484	3.030	4.241
24	1.810	1.630	5.170	4.684
24	2.189	1.750	6.255	5.026
24	2.564	1.860	7.324	5.315
24	2.949	1.918	8.427	5.479
24	3.416	1.988	9.761	5.679
24	3.827	2.019	10.034	5.768
24	4.157	2.060	11.877	5.886

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
26	0.000	1.353	0.000	3.866
26	0.000	0.452	0.000	1.291
26	0.208	0.669	0.594	1.912
26	0.465	0.881	1.320	2.518
26	0.794	1.102	2.267	3.148
26	1.177	1.333	3.363	3.808
26	1.694	1.533	4.846	4.381
26	2.225	1.635	6.357	4.670
26	3.000	1.801	8.571	5.146
26	3.612	1.855	10.321	5.299
26	4.031	1.800	11.517	5.399
26	4.298	1.908	12.270	5.450

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFXIT	R/REFXIT
28	0.000	1.361	0.000	3.890
28	0.004	0.551	0.011	1.574
28	0.130	0.841	0.371	2.403
28	0.324	1.090	0.025	3.114
28	0.603	1.336	1.723	3.817
28	0.905	1.613	2.585	4.608
28	1.291	1.927	3.690	5.506
28	1.746	2.204	4.088	6.297
28	2.190	2.392	6.257	6.833
28	2.691	2.580	7.680	7.371

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VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
30	0.000	1.363	0.000	3.894
30	0.020	0.442	0.000	1.263
30	0.140	0.672	0.400	1.921
30	0.350	0.040	1.023	2.685
30	0.023	1.386	2.630	3.959
30	1.241	1.585	3.545	4.528
30	1.575	1.806	4.490	5.159
30	2.048	2.000	5.851	5.715
30	2.415	2.136	6.000	6.104
30	2.813	2.282	8.039	6.520
30	3.240	2.405	9.283	6.871
30	3.660	2.474	10.456	7.069

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
32	0.000	1.343	0.000	3.837
32	0.000	0.417	0.002	1.191
32	0.150	0.530	0.453	1.514
32	0.434	0.650	1.240	1.858
32	0.785	0.774	2.243	2.212
32	1.246	0.800	3.561	2.312
32	1.640	0.820	4.710	2.343
32	2.470	0.825	7.082	2.356
32	2.970	0.836	8.511	2.390

VISCOUS PLUME BOUNDARY COORDINATES. SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
34	0.000	1.366	0.000	3.903
34	0.000	0.433	0.000	1.238
34	0.171	0.548	0.489	1.565
34	0.467	0.702	1.334	2.001
34	0.860	0.810	2.456	2.314
34	1.298	0.855	3.708	2.443
34	2.163	0.857	6.180	2.447
34	2.590	0.874	7.400	2.498
34	3.212	0.866	9.178	2.474

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
36	0.700	1.365	0.000	3.901
36	0.700	0.410	0.000	1.171
36	0.134	0.506	0.382	1.447
36	0.420	0.584	1.227	1.669
36	0.763	0.607	2.181	1.734
36	1.080	0.581	3.112	1.660

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VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PLUME NO.	Y (INCHES)	R (INCHES)	Y/DEFUIT	R/REFUIT
38	0.000	1.354	0.000	3.881
38	0.000	0.421	0.000	1.200
38	0.121	0.494	0.345	1.423
38	0.342	0.544	0.078	1.565
38	0.582	0.554	1.658	1.572
38	0.790	0.545	2.283	1.556
38	1.038	0.517	2.065	1.478
38	1.593	0.492	4.552	1.407
38	1.972	0.506	5.635	1.447

VISCOUS PLUME BOUNDARY COORDINATES. SET 5

PLATO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
40	2.122	1.374	0.027	3.926
40	2.020	1.430	0.000	1.254
40	2.208	1.552	0.594	1.578
40	2.560	1.615	1.625	1.758
40	2.893	2.626	2.552	1.789
40	1.661	2.632	4.746	1.801
40	2.238	2.619	5.822	1.767

VISCIOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFVIT	R/REFVIT
42	0.000	1.365	0.000	3.899
42	0.002	2.416	0.002	1.189
42	0.192	0.569	0.540	1.627
42	0.422	0.726	1.207	2.016
42	0.755	0.822	2.156	2.347
42	1.144	0.863	3.270	2.465
42	1.836	0.920	5.159	2.627
42	2.227	0.931	6.364	2.661
42	2.632	0.931	7.520	2.661
42	3.095	0.920	8.843	2.654

VISCOUS PLUME BOUNDARY COORDINATES: SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
44	0.000	1.350	0.000	3.883
44	0.001	1.402	0.002	1.405
44	0.194	1.694	0.553	1.983
44	0.450	1.962	1.285	2.463
44	0.825	1.105	2.350	3.156
44	1.221	1.365	3.497	3.899
44	1.570	1.602	4.484	4.577
44	1.962	1.811	5.606	5.175
44	2.696	2.217	7.722	6.335
44	3.189	2.406	8.827	6.875
44	3.478	2.577	9.036	7.362
44	3.810	2.735	12.912	7.816
44	4.480	3.046	12.799	8.702
44	4.824	3.170	13.784	9.058
44	5.139	3.302	14.684	9.434
44	5.424	3.445	15.498	9.843

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
46	0.122	1.356	0.082	3.874
46	0.240	1.474	0.082	1.354
46	0.156	0.671	0.447	1.916
46	0.439	0.894	1.254	2.554
46	0.797	1.124	2.278	3.212
46	1.151	1.313	3.292	3.752
46	1.510	1.512	4.341	4.321
46	2.294	1.892	6.553	5.406
46	2.748	2.110	7.851	6.228
46	3.171	2.335	9.062	6.671
46	3.569	2.524	10.198	7.211
46	3.953	2.682	11.294	7.662
46	4.326	2.842	12.361	8.116
46	4.736	3.012	13.531	8.607
46	5.104	3.179	14.584	9.083
46	5.511	3.343	15.747	9.552

VISCOUS PLUME BOUNDARY COORDINATES. SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
48	2.107	0.477	2.007	1.363
48	2.167	0.673	2.465	1.923
48	2.461	0.667	1.314	2.456
48	2.859	1.184	2.454	3.096
48	1.211	1.277	3.459	3.648
48	1.607	1.467	4.597	4.190
48	2.217	1.680	5.762	4.801
48	2.456	1.846	7.018	5.275
48	2.820	2.045	8.058	5.844
48	3.209	2.248	9.169	6.422
48	4.001	2.543	11.432	7.267
48	4.445	2.731	12.490	7.802
48	4.830	2.892	13.790	8.262
48	5.201	3.053	14.867	8.722
48	5.524	3.191	15.782	9.118

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
50	0.000	1.371	0.000	3.917
50	0.000	0.469	0.000	1.340
50	0.103	0.600	0.296	1.714
50	0.268	0.706	0.767	2.016
50	0.595	0.882	1.700	2.521
50	0.947	1.043	2.705	2.979
50	1.631	1.340	4.659	3.830
50	1.957	1.512	5.593	4.319
50	2.662	1.811	7.604	5.175
50	3.019	1.956	8.627	5.588
50	3.461	2.140	9.880	6.115
50	3.832	2.296	10.952	6.560
50	4.659	2.598	13.313	7.422
50	5.090	2.767	14.544	7.884

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
54	0.000	1.370	0.000	3.939
54	0.000	0.434	0.000	1.240
54	0.121	0.610	0.347	1.767
54	0.337	0.820	0.962	2.343
54	0.654	1.001	1.867	2.859
54	0.990	1.173	2.854	3.352
54	1.393	1.425	3.981	4.070
54	1.696	1.583	4.846	4.524
54	2.016	1.715	5.750	4.901
54	2.306	1.851	6.580	5.288
54	2.614	1.997	7.460	5.706
54	2.910	2.108	8.313	6.022
54	3.243	2.291	9.267	6.546
54	3.511	2.402	10.032	6.862
54	3.815	2.535	10.890	7.242
54	4.073	2.657	11.637	7.591
54	4.385	2.772	12.528	7.920
54	4.711	2.907	13.450	8.307
54	5.013	3.033	14.322	8.665
54	5.436	3.210	15.531	9.196

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VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
56	0.840	1.366	0.000	3.993
56	0.840	0.470	0.000	1.343
56	0.140	0.650	0.425	1.863
56	0.336	0.835	0.960	2.385
56	0.550	1.000	1.696	2.879
56	0.804	1.173	2.303	3.352
56	1.050	1.300	3.005	3.739
56	1.357	1.473	3.877	4.208
56	1.633	1.634	4.666	4.668
56	1.910	1.786	5.457	5.104
56	2.143	1.920	6.120	5.490
56	2.412	2.046	6.891	5.846
56	2.670	2.171	7.636	6.204
56	2.908	2.280	8.300	6.520
56	3.150	2.390	9.005	6.851
56	3.383	2.500	9.665	7.169
56	3.670	2.600	10.225	7.453
56	3.800	2.700	10.870	7.720

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
58	0.000	1.379	0.000	3.939
58	0.000	0.478	0.000	1.367
58	0.128	0.676	0.367	1.932
58	0.384	0.909	1.096	2.599
58	0.762	1.136	2.178	3.159
58	1.145	1.326	3.272	3.788
58	1.524	1.537	4.355	4.392
58	1.892	1.726	5.416	4.875
58	2.318	1.928	6.624	5.508
58	3.184	2.326	9.098	6.646
58	3.614	2.524	10.325	7.211
58	4.051	2.725	11.574	7.787
58	4.540	2.954	12.973	8.440
58	4.968	3.094	14.193	8.840
58	5.607	3.340	16.020	9.569

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
60	0.000	1.354	0.000	3.870
60	0.000	0.477	0.000	1.363
60	0.104	0.663	0.298	1.894
60	0.354	0.846	1.011	2.418
60	0.633	1.043	1.807	2.979
60	0.951	1.178	2.719	3.365
60	1.328	1.364	3.794	3.897
60	1.715	1.554	4.901	4.439
60	2.076	1.728	5.031	4.937
60	2.418	1.894	6.886	5.410
60	2.809	2.057	8.027	5.877
60	3.182	2.238	9.091	6.393
60	3.581	2.410	10.232	6.911
60	4.000	2.553	11.430	7.203
60	4.392	2.711	12.548	7.744
60	4.715	2.882	13.473	8.233
60	5.091	3.100	15.118	8.856

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	Z (INCHES)	Y/REXIT	Z/REXIT
42	0.000	1.374	0.000	3.923
42	0.000	0.474	0.000	1.360
42	0.168	0.657	0.440	1.876
42	0.485	0.830	1.387	2.378
42	0.896	1.025	2.561	2.928
42	1.376	1.245	3.030	3.557
42	1.898	1.490	5.424	4.257
42	2.396	1.687	6.846	4.821
42	2.897	1.902	8.278	5.435
42	3.426	2.087	9.787	5.962
42	3.962	2.343	11.310	6.695
42	4.446	2.515	12.704	7.186
42	4.895	2.640	13.986	7.569
42	5.322	2.810	15.204	8.056
42	5.663	2.933	16.180	8.465

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/RFXIT	R/RFXIT
68	0.700	1.357	0.000	3.877
68	0.800	1.453	0.000	1.294
68	0.128	0.652	0.365	1.863
68	0.324	0.831	0.927	2.374
68	0.595	1.041	1.700	2.972
68	0.931	1.242	2.661	3.548
68	1.267	1.438	3.619	4.108
68	1.594	1.629	4.555	4.650
68	1.921	1.817	5.488	5.190
68	2.279	2.003	6.511	5.724
68	2.707	2.222	7.736	6.348
68	3.107	2.408	8.876	6.880
68	3.480	2.595	9.067	7.413
68	3.981	2.782	11.090	7.949
68	4.286	2.956	12.246	8.445
68	4.706	3.134	13.446	8.954
68	5.091	3.321	14.546	9.432
68	5.486	3.464	15.676	9.896

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
70	0.000	1.361	0.000	3.890
70	0.000	0.000	0.000	0.000
70	0.000	0.436	0.000	1.245
70	0.268	0.584	0.196	1.674
70	0.265	0.786	0.756	2.245
70	0.506	0.055	1.447	2.730
70	0.931	1.145	2.374	3.272
70	1.164	1.330	3.325	3.709
70	1.571	1.546	4.488	4.417
70	1.901	1.736	5.430	4.961
70	2.250	1.912	6.455	5.462
70	2.593	2.080	7.400	5.942
70	2.944	2.230	8.411	6.397
70	3.310	2.410	9.458	6.891
70	3.757	2.605	10.734	7.442
70	4.214	2.805	12.030	8.013
70	4.723	3.013	13.495	8.609
70	5.160	3.193	14.744	9.123
70	5.537	3.340	15.820	9.569

VISCOUS PLUME BOUNDARY COORDINATES: SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	V/REFIT	R/REFIT
72	2.200	1.366	0.002	3.903
72	2.000	0.467	2.000	1.334
72	0.102	0.650	0.540	1.883
72	0.553	2.842	1.580	2.425
72	1.524	1.106	4.355	3.161
72	2.032	1.205	5.806	3.443
72	2.583	1.353	7.380	3.866

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	X (INCHES)	Y (INCHES)	X/REFIT	Y/REFIT
74	0.000	1.364	0.000	3.897
74	0.000	0.436	0.000	1.245
74	0.114	0.572	0.327	1.634
74	0.349	0.705	0.996	2.014
74	0.650	0.833	1.858	2.381
74	0.937	0.911	2.670	2.603
74	1.233	0.942	3.523	2.692
74	1.550	0.949	4.424	2.707
74	1.834	0.957	5.230	2.734
74	2.142	0.972	6.120	2.779
74	2.584	1.027	7.382	2.876
74	2.929	1.044	8.365	2.983

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
7A	2.200	1.372	0.000	3.921
7A	2.200	1.340	0.000	0.996
7A	2.240	1.496	0.113	1.418
7A	2.175	0.692	0.500	1.972
7A	0.371	0.868	1.060	2.481
7A	0.679	1.071	1.041	3.261
7A	1.018	1.264	2.907	3.612
7A	1.472	1.450	4.190	4.143
7A	1.850	1.566	5.308	4.475
7A	2.241	1.743	6.402	4.979
7A	2.612	1.951	7.462	5.575

VISCOSITY PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	X (INCHES)	Y/REFXIT	X/REFXIT
79	0.000	1.377	0.000	3.934
79	0.000	0.385	0.000	1.100
79	0.126	0.624	0.360	1.783
79	0.338	0.830	0.965	2.398
79	0.673	1.044	1.923	2.983
79	1.460	1.430	4.172	4.086
79	1.983	1.624	5.666	4.584
79	2.525	1.773	7.215	5.066
79	3.067	1.926	8.763	5.502

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VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REXIT
R1	0.000	1.378	0.000	3.937
R1	0.000	0.367	0.000	1.049
R1	0.124	0.557	0.353	1.592
R1	0.339	0.769	0.969	2.196
R1	0.602	0.934	1.720	2.674
R1	0.843	1.114	2.694	3.183
R1	1.341	1.246	3.832	3.559
R1	1.723	1.363	4.924	3.894
R1	2.480	1.544	7.086	4.410
R1	2.878	1.593	8.222	4.552
R1	3.610	1.677	10.314	4.792

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFYIT	R/REFYIT
R3	0.202	1.369	0.000	3.910
R3	0.200	0.380	0.000	1.087
R3	0.296	0.552	0.273	1.578
R3	0.307	0.747	0.876	2.134
R3	0.581	0.887	1.660	2.534
R3	0.916	1.023	2.610	2.923
R3	1.266	1.136	3.617	3.245
R3	1.682	1.245	4.806	3.557
R3	2.083	1.347	5.053	3.850
R3	2.485	1.428	7.100	4.081
R3	2.883	1.528	6.230	4.366
R3	3.225	1.610	9.214	4.626

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
#5	0.000	1.380	0.000	3.968
#5	0.000	0.450	0.000	1.311
#5	0.147	0.675	0.420	1.927
#5	0.362	0.881	1.034	2.516
#5	1.233	1.295	3.523	3.701
#5	1.668	1.491	4.764	4.259
#5	2.733	1.846	7.800	5.275
#5	3.228	1.964	9.223	5.610

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
P7	0.300	0.326	0.000	0.931
P7	0.401	0.407	0.262	1.420
P7	0.261	0.635	0.747	1.814
P7	0.440	0.750	1.258	2.230
P7	0.653	0.881	1.865	2.516
P7	0.945	0.980	2.721	2.801
P7	1.249	1.046	3.568	2.988
P7	1.560	1.106	4.484	3.161
P7	1.920	1.161	5.513	3.317
P7	2.350	1.227	6.713	3.505
P7	2.768	1.231	7.909	3.517
P7	3.200	1.251	9.160	3.574
P7	3.572	1.240	10.205	3.543
P7	3.984	1.235	11.383	3.530
P7	4.435	1.207	12.670	3.448
P7	4.790	1.186	13.713	3.388
P7	5.155	1.140	14.720	3.256

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
P9	0.002	0.294	0.007	0.847
P9	0.115	0.466	0.320	1.331
P9	0.271	0.640	0.774	1.827
P9	0.555	0.801	1.587	2.290
P9	0.890	0.882	2.543	2.521
P9	1.253	0.931	3.579	2.661
P9	1.689	0.974	4.826	2.787
P9	2.113	0.991	6.037	2.832
P9	2.500	0.992	7.142	2.834
P9	2.950	0.964	8.454	2.743
P9	3.442	0.934	9.834	2.667
P9	3.781	0.871	10.803	2.490

VISCOUS FLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
02	0.000	1.354	0.000	3.879
02	0.000	0.391	0.000	1.116
02	0.097	0.564	0.278	1.623
02	0.285	0.727	0.814	2.276
02	0.493	0.839	1.400	2.396
02	0.696	0.953	1.989	2.723
02	0.985	1.047	2.814	2.902
02	1.249	1.127	3.570	3.163
02	1.424	1.181	4.430	3.374
02	2.168	1.339	6.193	3.826
02	2.474	1.365	7.069	3.899
02	2.808	1.426	8.022	4.017

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VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
04	0.000	1.374	0.000	3.926
04	0.000	0.430	0.002	1.229
04	0.072	0.673	0.205	1.923
04	0.220	0.853	0.654	2.436
04	0.406	0.980	1.160	2.801
04	0.680	1.151	1.943	3.288
04	0.948	1.325	2.707	3.786
04	1.287	1.497	3.677	4.277
04	1.599	1.668	4.568	4.766
04	1.953	1.845	5.570	5.270
04	2.311	2.007	6.602	5.735
04	2.625	2.178	7.500	6.222
04	3.261	2.496	9.318	7.131

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
06	0.000	1.364	0.000	3.897
06	0.000	2.401	0.000	1.147
06	0.100	0.591	0.300	1.687
06	0.243	0.752	0.694	2.150
06	0.507	0.892	1.449	2.547
06	0.821	1.027	2.345	2.934
06	1.110	1.134	3.172	3.239
06	1.472	1.252	4.206	3.577
06	1.821	1.318	5.204	3.766
06	2.132	1.397	6.093	3.992
06	2.477	1.477	7.078	4.221
06	2.798	1.586	7.993	4.532

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
08	0.000	0.350	0.000	1.000
08	0.066	0.546	0.190	1.560
08	0.171	0.723	0.490	2.065
08	0.343	0.880	0.080	2.540
06	2.563	1.021	1.610	2.917
08	0.509	1.170	2.312	3.342
08	1.068	1.326	3.052	3.790
08	1.380	1.484	3.942	4.240
08	1.648	1.636	4.710	4.675
08	1.912	1.788	5.462	5.107
08	2.226	1.921	6.360	5.490
08	2.586	2.033	7.387	5.807
08	2.967	2.153	8.477	6.152
08	3.508	2.352	10.022	6.720

VISCOUS PLUME BOUNDARY COORDINATES. SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
100	0.403	1.471	0.200	3.914
100	0.000	0.471	0.200	1.056
100	0.125	0.567	0.358	1.620
100	0.253	0.741	0.722	2.118
100	0.420	0.890	1.225	2.570
100	0.551	1.015	1.574	2.899
100	0.725	1.116	2.072	3.188
100	0.944	1.234	2.696	3.525
100	1.143	1.358	3.265	3.881
100	1.393	1.504	3.970	4.207
100	1.659	1.622	4.741	4.635
100	1.877	1.743	5.364	4.981
100	2.092	1.858	5.977	5.308
100	2.374	1.985	6.784	5.671
100	2.630	2.098	7.515	5.905
100	2.917	2.214	8.333	6.326
100	3.408	2.410	9.738	6.911
100	3.672	2.506	10.492	7.160

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
102	0.000	1.356	0.000	3.874
102	0.000	0.405	0.000	1.156
102	0.111	0.610	0.318	1.749
102	0.293	0.815	0.836	2.330
102	0.480	0.958	1.398	2.739
102	0.715	1.090	2.043	3.139
102	0.968	1.217	2.765	3.477
102	1.288	1.335	3.679	3.814
102	1.551	1.470	4.430	4.199
102	1.811	1.578	5.175	4.508
102	2.142	1.668	6.120	4.766
102	2.481	1.747	7.089	4.990
102	2.801	1.821	8.002	5.201

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFXIT	R/REFXIT
104	0.000	1.360	0.000	3.886
104	0.002	0.408	0.000	1.165
104	0.121	0.616	0.347	1.761
104	0.301	0.830	0.860	2.372
104	0.560	0.990	1.627	2.827
104	0.862	1.141	2.463	3.259
104	1.194	1.306	3.412	3.732
104	1.507	1.445	4.394	4.128
104	1.864	1.544	5.326	4.410
104	2.617	1.768	7.478	5.253
104	2.098	1.796	8.565	5.130

VISCOUS PLUME BOUNDARY COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
106	0.000	1.367	0.000	3.906
106	0.000	1.358	0.000	1.023
106	0.056	0.506	0.160	1.447
106	0.168	0.653	0.480	1.865
106	0.306	0.784	0.874	2.241
106	0.520	0.909	1.485	2.596
106	0.678	1.002	1.938	2.863
106	0.980	1.123	2.801	3.210
106	1.247	1.221	3.563	3.488
106	1.624	1.338	4.641	3.823
106	1.960	1.466	5.590	4.188
106	2.238	1.561	6.395	4.461
106	2.546	1.645	7.275	4.701
106	2.851	1.683	8.145	4.808
106	3.178	1.715	9.080	4.901
106	3.461	1.720	9.880	4.941

VISCOUS PLUME BOUNDARY COORDINATES, SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
1	0.780	1.350	0.600	1.000
1	0.845	1.450	0.6130	1.310
1	0.921	1.517	0.645	1.477
1	0.997	1.589	0.662	1.682
1	0.980	1.640	0.800	1.855
1	0.915	1.751	1.185	2.145
1	0.903	1.820	1.437	2.370
1	0.602	1.881	1.720	2.517
1	0.738	1.934	2.187	2.670
1	1.043	1.956	2.080	3.017
1	1.211	1.998	3.400	3.137
1	1.379	1.144	3.040	3.270
1	1.606	1.170	4.590	3.360
1	1.760	1.212	5.030	3.462
1	1.963	1.246	5.610	3.560
1	2.345	1.325	6.700	3.785

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VISCOUS PLUME BOUNDARY COORDINATES, SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
3	0.000	0.000	0.000	0.000
3	0.000	1.355	0.000	3.872
3	0.000	0.346	0.000	0.989
3	0.247	0.302	0.055	1.500
3	0.284	0.436	0.240	0.305
3	0.172	0.471	0.491	1.345
3	0.253	0.400	0.722	1.425
3	0.331	0.531	0.945	1.514
3	0.530	0.595	1.540	1.700
3	0.731	0.623	2.080	1.781
3	0.885	0.648	2.527	1.852
3	0.070	0.663	2.770	1.804
3	1.323	0.698	3.781	1.904
3	1.474	0.698	4.210	1.994
3	1.504	0.710	4.555	2.029

VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
5	0.000	0.350	0.000	1.000
5	0.104	0.476	0.297	1.360
5	0.286	0.550	0.817	1.597
5	0.484	0.608	1.097	1.730
5	0.493	0.647	1.407	1.850
5	0.721	0.715	2.060	2.042
5	0.870	0.740	2.485	2.115
5	1.005	0.759	2.872	2.170
5	1.168	0.757	3.337	2.162
5	1.321	0.777	3.775	2.220
5	1.485	0.783	4.242	2.237
5	1.774	0.807	5.067	2.305

VISCOUS PLUME BOUNDARY COORDINATES, SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
7	0.000	0.350	0.000	1.000
7	0.000	0.397	0.000	1.135
7	0.048	0.460	0.137	1.315
7	0.117	0.516	0.335	1.475
7	0.188	0.580	0.537	1.657
7	0.276	0.640	0.787	1.830
7	0.351	0.686	1.002	1.960
7	0.528	0.795	1.507	2.272
7	0.650	0.840	1.857	2.425
7	0.766	0.897	2.187	2.562
7	0.871	0.941	2.490	2.667
7	0.990	0.990	2.827	2.845
7	1.288	1.090	3.680	3.115
7	1.431	1.131	4.090	3.232
7	1.578	1.170	4.507	3.342
7	1.771	1.201	5.060	3.432
7	1.937	1.240	5.535	3.542

VISCOUS PLUME BOUNDARY COORDINATES. SET A

POINT NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
0	0.000	0.351	0.000	1.000
0	0.132	0.500	0.092	1.430
0	0.279	0.557	0.225	1.592
0	0.420	0.634	0.367	1.812
0	0.497	0.687	0.562	1.962
0	0.750	0.737	0.715	2.105
0	0.815	0.767	0.900	2.192
0	0.900	0.836	1.115	2.300
0	0.472	0.890	1.350	2.542
0	0.554	0.941	1.582	2.690
0	0.672	0.980	1.920	2.822
0	0.775	1.037	2.215	2.962
0	0.880	1.060	2.515	3.055
0	0.987	1.111	2.821	3.172
0	1.124	1.162	3.212	3.320
0	1.254	1.210	3.582	3.462
0	1.395	1.257	3.985	3.502
0	1.520	1.291	4.367	3.690
0	1.630	1.324	4.682	3.782
0	1.824	1.360	5.212	3.912
0	1.961	1.401	5.602	4.002

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
11	0.000	0.350	0.000	1.000
11	0.345	0.910	0.985	2.600
11	0.811	1.167	2.317	3.335
11	1.290	1.439	3.685	4.112
11	1.752	1.682	5.005	4.805
11	2.715	2.212	7.757	6.320
11	3.230	2.392	9.255	6.835
11	3.709	2.613	10.597	7.465
11	4.170	2.830	11.915	8.085
11	4.632	3.012	13.235	8.605
11	5.056	3.228	14.445	9.222
11	5.562	3.428	15.892	9.795
11	6.200	3.663	17.715	10.465

VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
13	0.000	0.350	0.000	1.000
13	0.476	0.978	1.360	2.795
13	1.127	1.207	3.220	3.450
13	1.042	1.443	5.550	4.122
13	2.780	1.673	7.042	4.780
13	3.895	2.194	11.130	6.270
13	4.473	2.386	12.780	6.817
13	5.010	2.587	14.315	7.392
13	6.250	2.874	17.285	8.212
13	6.354	3.041	18.155	8.600

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VISCOUS PLUME BOUNDARY COORDINATES, SET A

PLUME NO.	V (INCHES)	R (INCHES)	V/REVIT	R/REVIT
15	0.000	0.350	0.000	1.000
15	0.062	0.562	0.177	1.662
15	0.115	0.692	0.327	1.977
15	0.168	0.760	0.542	2.257
15	0.286	0.936	0.817	2.587
15	0.375	1.004	1.072	2.872
15	0.486	1.116	1.387	3.107
15	0.611	1.220	1.745	3.485
15	0.724	1.327	2.067	3.792
15	0.784	1.435	2.240	4.100
15	0.903	1.500	2.580	4.310
15	1.122	1.661	3.205	4.745
15	1.250	1.750	3.572	5.000
15	1.382	1.835	3.950	5.242
15	1.504	1.911	4.297	5.460
15	1.613	1.986	4.607	5.675
15	1.704	2.044	4.870	5.840
15	1.857	2.117	5.305	6.050
15	1.990	2.194	5.685	6.267
15	2.142	2.270	6.120	6.485

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
17	0.000	1.350	0.000	3.883
17	0.000	0.300	0.000	1.114
17	0.050	0.510	0.160	1.458
17	0.098	0.596	0.280	1.703
17	0.151	0.682	0.431	1.949
17	0.235	0.794	0.671	2.267
17	0.321	0.924	0.918	2.641
17	0.405	1.040	1.158	2.972
17	0.506	1.153	1.445	3.294
17	0.620	1.270	1.796	3.654
17	0.747	1.409	2.134	4.026
17	0.897	1.558	2.563	4.452
17	1.030	1.681	2.970	4.824
17	1.203	1.817	3.437	5.193
17	1.354	1.962	3.870	5.606
17	1.471	2.086	4.203	5.959
17	1.570	2.210	4.510	6.315
17	1.697	2.313	4.848	6.609
17	1.859	2.420	5.313	6.913

VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	X (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
20	0.000	1.354	0.000	3.868
20	0.000	1.377	0.000	1.076
20	0.058	1.454	0.167	1.296
20	0.117	1.588	0.336	1.680
20	0.173	1.685	0.494	1.956
20	0.226	1.790	0.647	2.256
20	0.302	1.927	0.862	2.647
20	0.401	1.961	1.147	3.032
20	0.513	1.193	1.465	3.408
20	0.625	1.323	1.785	3.779
20	0.731	1.456	2.087	4.161
20	0.860	1.580	2.458	4.541
20	1.032	1.702	2.950	4.864
20	1.179	1.826	3.370	5.217
20	1.312	1.967	3.750	5.619
20	1.443	2.070	4.123	5.939
20	1.580	2.175	4.515	6.215
20	1.742	2.278	4.977	6.509
20	1.885	2.387	5.386	6.820
20	2.023	2.483	5.779	7.095
20	2.191	2.592	6.260	7.404
20	2.337	2.714	6.677	7.756
20	2.440	2.806	6.971	8.011

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
23	0.000	1.351	0.000	3.859
23	0.000	0.370	0.000	1.058
23	0.047	0.479	0.133	1.369
23	0.115	0.610	0.329	1.769
23	0.198	0.750	0.567	2.167
23	0.314	0.880	0.896	2.539
23	0.436	1.034	1.245	2.954
23	0.587	1.176	1.678	3.361
23	0.728	1.295	2.081	3.609
23	0.904	1.433	2.583	4.095
23	1.092	1.565	3.121	4.472
23	1.283	1.680	3.665	4.826
23	1.475	1.833	4.215	5.237
23	1.680	1.974	4.790	5.639
23	1.880	2.087	5.397	5.962
23	2.025	2.193	5.786	6.257
23	2.176	2.297	6.217	6.562
23	2.367	2.405	6.764	6.871
23	2.555	2.492	7.320	7.120
23	2.755	2.574	7.871	7.351
23	2.985	2.677	8.530	7.649
23	3.205	2.781	9.154	7.947

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VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
25	0.200	1.357	0.000	0.177
25	0.000	0.872	0.000	1.063
25	0.166	1.486	0.180	1.389
25	0.170	1.627	0.511	1.702
25	0.346	1.790	0.080	2.256
25	0.500	2.034	1.454	2.670
25	0.660	1.066	1.885	3.245
25	0.832	1.174	2.378	3.354
25	1.032	1.296	2.048	3.703
25	1.236	1.430	3.532	4.110
25	1.420	1.572	4.083	4.400
25	1.638	1.681	4.681	4.804
25	1.852	1.800	5.293	5.141
25	2.068	1.921	5.908	5.488
25	2.297	2.030	6.564	5.709
25	2.434	2.142	6.055	6.120
25	2.627	2.238	7.507	6.303
25	2.882	2.351	8.236	6.715
25	3.166	2.434	9.047	6.955
25	3.470	2.556	9.041	7.302

ALSCONS PLUM Boundary COORDINATE SET 6

PHOTO NO.	Y (INCHES)	X (INCHES)	Y/REF IT	X/REF IT
2A	0.000	1.353	0.000	3.866
2A	0.000	0.370	0.000	1.083
2A	0.079	0.450	0.025	1.311
2A	0.209	0.582	0.098	1.663
2A	0.352	0.689	1.007	1.969
2A	0.535	0.821	1.529	2.343
2A	0.745	0.932	2.120	2.663
2A	0.930	1.022	2.683	2.921
2A	1.141	1.127	3.250	3.221
2A	1.382	1.274	3.948	3.639
2A	1.689	1.421	4.824	4.059
2A	1.988	1.541	5.679	4.403
2A	2.280	1.667	6.515	4.764
2A	2.015	1.891	8.320	5.404
2A	3.270	1.986	9.343	5.675
2A	3.657	2.060	10.447	5.911
2A	4.005	2.208	11.690	6.328

WISCONSIN PLUME BOUNDARY COORDINATES, SET A

POINT NO.	X (INCHES)	Y (INCHES)	W/REXIT	H/REXIT
32	1.100	2.351	0.907	1.000
32	1.100	1.401	0.310	1.400
32	0.277	0.577	0.792	1.647
32	0.445	1.654	1.272	1.870
32	0.569	0.717	1.212	2.150
32	1.273	0.856	3.637	2.532
32	1.513	1.063	4.601	2.752
32	2.020	1.032	5.737	2.947
32	2.492	1.084	7.122	3.097
32	3.246	1.067	9.275	3.150
32	3.543	1.111	10.110	3.145
32	3.870	1.123	11.082	3.207

VISCOUS PLUME BOUNDARY COORDINATES, SET 6

PHOTO NO.	V (INCHES)	R (INCHES)	V/REFIT	R/REFIT
32	1.100	0.350	2.300	1.000
32	1.123	0.466	2.350	1.332
32	2.350	0.563	1.000	1.610
32	0.726	0.446	2.175	1.960
32	1.048	0.780	2.095	2.230
32	1.362	0.862	3.292	2.462
32	1.781	0.927	5.287	2.650
32	2.185	0.913	6.242	2.610
32	2.352	0.927	8.142	2.647
32	3.153	0.917	9.212	2.620
32	3.436	0.927	9.917	2.647
32	3.807	0.948	12.877	2.707

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VISCOUS PLUME BOUNDARY COORDINATES. SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
34	0.400	0.350	0.000	1.000
34	0.490	0.470	0.257	1.357
34	0.308	0.615	0.880	1.757
34	0.580	0.750	1.657	2.150
34	0.920	0.867	2.627	2.477
34	1.255	0.955	3.585	2.727
34	1.634	1.020	4.667	2.940
34	1.927	1.059	5.505	3.025
34	2.260	1.098	6.482	3.137
34	2.540	1.120	7.257	3.225

VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
36	0.200	0.350	0.500	1.400
36	0.272	0.540	0.505	1.542
36	0.195	0.644	0.557	1.840
36	0.316	0.735	0.902	2.100
36	0.549	0.822	1.570	2.350
36	0.735	0.883	2.100	2.522
36	0.960	0.934	2.742	2.670
36	1.183	0.994	3.382	2.852
36	1.403	1.061	4.010	3.032
36	1.723	1.130	4.022	3.230
36	2.030	1.172	5.800	3.347
36	2.366	1.234	6.760	3.440
36	2.674	1.247	7.640	3.562
36	2.986	1.270	8.530	3.655
36	3.291	1.316	9.422	3.760

VISCOUS PLUME BOUNDARY COORDINATES, SET A

POINT NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
24	0.222	0.354	0.620	1.000
28	0.060	0.510	0.197	1.480
32	0.193	0.627	0.552	1.792
36	0.344	0.712	0.870	2.035
38	0.498	0.796	1.422	2.275
40	0.783	0.878	2.237	2.527
42	1.317	1.010	3.762	2.912
44	1.725	1.090	4.927	3.137
46	2.240	1.126	5.832	3.217
48	2.365	1.180	6.757	3.397
50	2.729	1.234	7.797	3.525
52	3.172	1.294	9.062	3.697
54	3.167	1.293	9.252	3.695

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
42	0.000	1.357	0.000	3.877
42	0.000	0.365	0.000	1.043
40	0.065	0.466	0.184	1.336
40	0.258	0.664	0.736	1.896
40	0.385	0.727	1.100	2.278
40	0.548	0.780	1.565	2.254
40	0.752	0.850	2.150	2.427
40	0.948	0.914	2.712	2.612
40	1.138	0.965	3.252	2.756
40	1.381	1.021	3.946	2.916
40	1.657	1.086	4.735	3.103
42	1.926	1.139	5.522	3.254
40	2.182	1.173	6.233	3.352
40	2.415	1.207	6.900	3.450
40	2.607	1.238	7.440	3.537
40	2.830	1.267	8.285	3.619
42	2.997	1.282	8.562	3.663

VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/PEXIT	R/PEXIT
42	0.000	1.365	0.000	3.899
42	0.000	0.371	0.000	1.060
42	0.072	0.460	0.207	1.340
42	0.156	0.567	0.447	1.620
42	0.237	0.642	0.678	1.834
42	0.352	0.706	1.007	2.016
42	0.513	0.762	1.467	2.178
42	0.706	0.822	2.018	2.347
42	0.906	0.872	2.590	2.492
42	1.123	0.910	3.210	2.625
42	1.360	0.973	3.912	2.781
42	1.643	1.027	4.695	2.934
42	1.890	1.068	5.426	3.052
42	2.120	1.112	6.057	3.176
42	2.350	1.155	6.713	3.301
42	2.630	1.211	7.513	3.461

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
44	0.000	1.357	0.000	3.877
44	0.000	1.364	0.000	1.040
44	0.083	0.490	0.238	1.425
44	0.198	0.597	0.567	1.705
44	0.332	0.676	0.940	1.932
44	0.529	0.755	1.512	2.156
44	0.744	0.822	2.125	2.347
44	0.977	0.881	2.792	2.516
44	1.251	0.931	3.574	2.661
44	1.500	0.980	4.284	2.709
44	1.736	1.018	4.050	2.907
44	2.003	1.057	5.724	3.021
44	2.300	1.095	6.571	3.130

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VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
4A	0.000	1.364	0.000	3.807
4A	0.000	0.376	0.000	1.074
4A	0.061	0.451	0.173	1.289
4A	0.163	0.517	0.467	1.476
4A	0.272	0.587	0.778	1.676
4A	0.403	0.643	1.151	1.838
4A	0.540	0.680	1.569	1.969
4A	0.720	0.728	2.056	2.081
4A	0.927	0.766	2.650	2.187
4A	1.127	0.806	3.221	2.303
4A	1.596	0.877	4.559	2.505
4A	1.880	0.895	5.370	2.556
4A	2.108	0.915	6.022	2.614

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VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
4A	0.000	1.354	0.000	3.868
4A	0.000	0.345	0.000	0.987
4A	0.068	0.421	0.193	1.203
4A	0.201	0.490	0.573	1.427
4A	0.376	0.574	1.074	1.629
4A	0.605	0.631	1.720	1.803
4A	0.905	0.677	2.585	1.934
4A	1.176	0.701	3.350	2.003
4A	1.465	0.728	4.186	2.081
4A	1.761	0.751	5.030	2.145

VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
52	0.000	1.360	0.000	3.910
52	0.000	0.450	0.000	1.285
52	0.050	0.567	0.160	1.620
52	0.166	0.660	0.473	1.912
52	0.257	0.741	0.734	2.118
52	0.426	0.800	1.218	2.312
52	0.557	0.888	1.592	2.536
52	0.753	0.950	2.152	2.741
52	0.980	1.027	2.801	2.934
52	1.186	1.090	3.388	3.114
52	1.423	1.162	4.066	3.321
52	1.677	1.242	4.792	3.548
52	1.915	1.323	5.473	3.779
52	2.232	1.414	6.377	4.039

VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
5A	0.000	1.354	0.000	3.468
5A	0.000	1.402	0.000	1.140
5A	0.076	1.548	0.218	1.565
5A	0.140	1.641	0.427	1.832
5A	0.270	1.731	0.798	2.087
5A	0.418	1.811	1.194	2.318
5A	0.575	1.878	1.643	2.510
5A	0.772	1.955	2.205	2.730
5A	0.965	1.020	2.750	2.941
5A	1.193	1.114	3.410	3.183
5A	1.448	1.190	4.137	3.401
5A	1.710	1.260	4.010	3.625
5A	2.013	1.347	5.753	3.850
5A	2.300	1.426	6.571	4.074

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VISCOUS PLUME BOUNDARY COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
5A	0.000	0.472	0.000	1.349
5A	0.010	0.637	0.056	1.821
5A	0.064	0.740	0.182	2.254
5A	0.120	0.980	0.342	2.801
5A	0.180	1.142	0.513	3.279
5A	0.290	1.297	0.820	3.706
5A	0.399	1.467	1.140	4.192
5A	0.514	1.634	1.469	4.668
5A	0.683	1.789	1.952	5.110
5A	0.845	1.936	2.414	5.530
5A	1.053	2.092	3.010	5.977
5A	1.274	2.255	3.630	6.442
5A	1.501	2.447	4.288	6.901
5A	1.691	2.610	4.830	7.458
5A	1.868	2.748	5.337	7.851

VISCOUS PLUME BOUNDARY COORDINATES, SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
60	0.200	1.372	0.200	3.919
60	0.200	0.521	0.200	1.489
60	0.256	0.660	0.160	1.912
60	0.138	0.794	0.393	2.270
60	0.245	0.934	0.700	2.667
60	0.357	1.074	1.020	3.070
60	0.499	1.284	1.425	3.670
60	0.657	1.365	1.876	3.901
60	0.771	1.453	2.233	4.152
60	0.902	1.547	2.579	4.421
60	1.284	1.663	3.096	4.750

VISCOUS PLUME BOUNDARY COORDINATES, SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
61	0.000	1.364	2.000	3.886
61	0.030	1.462	0.000	1.320
61	0.054	0.598	0.153	1.707
61	0.131	0.734	0.373	2.098
61	0.207	0.850	0.591	2.427
61	0.317	0.951	0.905	2.719
61	0.440	1.071	1.258	3.061
61	0.548	1.183	1.567	3.379
61	0.676	1.288	1.832	3.681
61	0.831	1.397	2.374	3.992
61	0.974	1.500	2.783	4.310
61	1.130	1.612	3.230	4.606
61	1.423	1.786	4.066	5.101
61	1.607	1.890	4.590	5.426
61	1.790	1.991	5.139	5.688
61	1.998	2.066	5.708	5.904
61	2.185	2.125	6.242	6.073

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VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
63	2.000	1.356	0.000	3.874
63	0.000	0.458	0.000	1.309
63	0.050	0.540	0.169	1.569
63	0.180	0.655	0.516	1.872
63	0.296	0.759	0.847	2.167
63	0.477	0.860	1.363	2.456
63	0.646	0.971	1.845	2.774
63	0.863	1.070	2.465	3.083
63	1.091	1.170	3.116	3.343
63	1.556	1.351	4.446	3.861
63	1.830	1.435	5.228	4.099

VISCOUS PLUME BOUNDARY COORDINATES. SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
6F	0.000	1.361	0.000	3.888
6F	0.000	1.480	0.000	1.396
6F	0.075	1.584	0.214	1.669
6F	0.187	1.681	0.533	1.945
6F	0.331	1.791	0.945	2.261
6F	0.492	1.900	1.405	2.572
6F	0.703	2.095	2.009	2.843
6F	0.931	2.100	2.661	3.143
6F	1.171	1.204	3.345	3.439
6F	1.443	1.313	4.123	3.752
6F	1.756	1.435	5.017	4.101

VISCOUS PLUME BOUNDARY COORDINATES, SET 6

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/PEXIT	R/PEXIT
6A	0.000	1.355	0.000	3.872
6A	0.000	0.514	0.000	1.469
6A	0.077	0.619	0.220	1.743
6A	0.198	0.774	0.567	2.212
6A	0.423	1.010	1.200	2.912
6A	0.500	1.087	1.420	3.105
6A	0.660	1.208	1.885	3.452
6A	0.853	1.323	2.436	3.779
6A	1.204	1.423	2.867	4.266
6A	1.190	1.500	3.425	4.312

PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	X (INCHES)	R (INCHES)	X/REYIT	R/REYIT
78	0.000	0.321	0.000	0.916
78	0.040	0.414	0.140	1.183
78	0.155	0.560	0.442	1.670
78	0.353	0.754	1.000	2.154
78	0.634	0.930	1.812	2.659
78	0.939	1.018	2.683	2.907
78	1.296	1.127	3.703	3.219
78	1.686	1.230	4.817	3.539
78	2.087	1.331	5.964	3.803
78	2.504	1.387	7.155	3.963
78	2.932	1.456	8.379	4.159
78	3.325	1.466	9.500	4.188
78	3.727	1.506	10.650	4.303
78	4.141	1.516	11.830	4.330
78	4.580	1.505	13.086	4.301
78	5.022	1.500	14.349	4.286
78	5.361	1.469	15.318	4.197

PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
79	0.000	0.295	0.000	0.842
79	0.093	0.432	0.265	1.234
79	0.270	0.636	0.798	1.818
79	0.480	0.787	1.372	2.247
79	0.796	0.918	2.274	2.623
79	1.506	1.115	4.303	3.185
79	2.069	1.229	5.911	3.512
79	2.564	1.272	7.324	3.634
79	3.083	1.315	8.809	3.757
79	3.584	1.340	10.241	3.830
79	4.024	1.337	11.497	3.821
79	4.483	1.318	12.808	3.766
79	4.866	1.296	13.904	3.703

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PI LINE INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REVIT	R/REFIT
R1	0.000	0.363	0.000	1.036
R1	0.177	0.566	0.507	1.618
R1	0.500	0.752	1.429	2.150
R1	0.834	0.882	2.383	2.521
R1	1.217	0.980	3.477	2.801
R1	1.658	1.030	4.737	2.943
R1	2.143	1.073	6.122	3.065
R1	2.527	1.074	7.220	3.068
R1	2.913	1.067	8.322	3.050
R1	3.300	1.071	9.420	3.059
R1	3.625	1.036	10.356	2.959
R1	3.983	1.008	11.370	2.881
R1	4.334	0.962	12.384	2.747
R1	4.684	0.893	13.382	2.552
R1	5.050	0.815	14.429	2.327

PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REFIT
P3	0.000	0.314	0.000	0.887
P3	0.131	0.470	0.376	1.369
P3	0.410	0.654	1.171	1.867
P3	0.727	0.781	2.078	2.232
P3	1.067	0.822	3.048	2.347
P3	1.446	0.840	4.132	2.401
P3	2.197	0.818	6.277	2.338
P3	2.564	0.787	7.327	2.250
P3	2.910	0.737	8.313	2.105
P3	3.213	0.671	9.180	1.918
P3	3.535	0.587	10.101	1.678
P3	3.893	0.523	11.123	1.494
P3	4.481	0.357	12.821	1.020
P3	4.746	0.226	13.550	0.647

PLUME INTERVAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
A5	0.200	0.338	2.000	0.965
A5	0.177	0.616	0.505	1.761
A5	0.482	0.853	1.378	2.436
A5	0.576	0.893	1.645	2.552
A5	0.847	1.001	2.421	2.859
A5	1.196	1.088	3.417	3.110
A5	1.533	1.172	4.381	3.350
A5	1.926	1.273	5.504	3.637
A5	2.371	1.329	6.775	3.797
A5	2.800	1.376	8.007	3.930
A5	3.279	1.444	9.369	4.126
A5	3.987	1.494	11.392	4.268

PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
R7	0.000	1.344	0.000	3.841
R7	0.000	1.394	0.000	1.127
R7	0.096	1.591	0.276	1.689
R7	0.279	1.787	0.798	2.247
R7	0.576	1.948	1.645	2.710
R7	0.916	1.136	2.619	3.245
R7	1.266	1.311	3.617	3.746

PLINE INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/RFXIT	R/RFXIT
02	0.000	0.322	0.000	0.020
02	0.115	0.458	0.329	1.309
02	0.276	0.608	0.789	1.738
02	0.478	0.724	1.365	2.067
02	0.734	0.792	2.096	2.263
02	0.991	0.790	2.832	2.283
02	1.298	0.832	3.708	2.376
02	1.584	0.842	4.526	2.405
02	1.821	0.826	5.201	2.361
02	2.183	0.808	6.237	2.307
02	2.598	0.760	7.422	2.172
02	3.047	0.683	8.705	1.952
02	3.463	0.609	9.894	1.740
02	3.800	0.500	10.883	1.454
02	4.176	0.366	11.932	1.047
02	4.528	0.241	12.937	0.689

PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REVIT	R/REFIT
94	0.000	0.339	0.000	0.969
94	0.114	0.548	0.327	1.565
94	0.266	0.758	0.760	2.165
94	0.500	0.957	1.429	2.734
94	0.755	1.058	2.158	3.023
94	1.044	1.152	2.983	3.292
94	1.365	1.272	3.901	3.634
94	1.683	1.359	4.808	3.883
94	2.049	1.462	5.855	4.177
94	2.410	1.553	6.886	4.437
94	2.737	1.600	7.820	4.572
94	3.108	1.643	8.880	4.695
94	3.509	1.652	10.025	4.721
94	3.830	1.683	10.943	4.808
94	4.153	1.708	11.866	4.881
94	4.870	1.729	13.913	4.941
94	5.305	1.704	15.158	4.868
94	5.830	1.652	16.658	4.721

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PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
06	0.000	0.370	0.000	1.458
06	0.117	0.517	0.333	1.476
06	0.315	0.660	0.000	1.885
06	0.542	0.762	1.549	2.178
06	0.822	0.843	2.347	2.410
06	1.134	0.896	3.239	2.561
06	1.411	0.915	4.032	2.614
06	1.657	0.923	4.735	2.639
06	2.180	0.943	6.228	2.694
06	2.582	0.937	7.378	2.676
06	2.905	0.913	8.370	2.607
06	3.291	0.856	9.403	2.445
06	3.669	0.794	10.483	2.267
06	4.071	0.703	11.632	2.009
06	4.463	0.626	12.750	1.732
06	4.890	0.477	13.971	1.343
06	5.316	0.336	15.189	0.960

PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REVIT	R/REFIT
100	0.000	0.324	0.000	0.927
100	0.000	0.471	0.258	1.145
100	0.219	0.627	0.625	1.792
100	0.401	0.787	1.147	2.250
100	0.576	0.917	1.645	2.621
100	0.782	0.978	2.234	2.794
100	1.050	1.043	2.090	2.981
100	1.269	1.137	3.625	3.248
100	1.526	1.202	4.350	3.434
100	1.806	1.240	5.159	3.543
100	2.120	1.308	6.057	3.737
100	2.455	1.358	7.013	3.879
100	2.941	1.413	8.402	4.037
100	3.265	1.411	9.320	4.030
100	3.567	1.420	10.192	4.057
100	3.927	1.422	11.210	4.063
100	4.252	1.418	12.148	4.052
100	4.691	1.396	13.402	3.988
100	5.080	1.348	14.540	3.852
100	5.458	1.311	15.593	3.746

PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
102	0.000	0.346	0.000	0.989
102	0.118	0.523	0.338	1.494
102	0.291	0.703	0.831	2.709
102	0.511	0.867	1.460	2.476
102	0.696	0.934	1.987	2.670
102	0.909	1.022	2.596	2.863
102	1.131	1.077	3.232	3.076
102	1.383	1.134	3.950	3.252
102	1.642	1.200	4.690	3.430
102	2.001	1.254	5.717	3.583
102	2.315	1.302	6.615	3.721
102	2.640	1.347	7.542	3.848
102	2.957	1.367	8.449	3.906
102	3.247	1.404	9.276	4.010
102	3.617	1.407	10.734	4.019
102	3.912	1.410	11.177	4.028
102	4.205	1.440	12.015	4.115

PLINE INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
104	0.000	0.355	0.000	1.014
104	0.111	0.497	0.318	1.420
104	0.237	0.647	0.676	1.847
104	0.319	0.712	0.911	2.034
104	0.500	0.848	1.420	2.423
104	0.750	0.934	2.170	2.667
104	0.992	1.012	2.834	2.892
104	1.256	1.064	3.590	3.039
104	1.527	1.113	4.363	3.181
104	1.861	1.149	5.317	3.283
104	2.163	1.195	6.180	3.414
104	2.460	1.228	7.029	3.508
104	2.791	1.248	7.976	3.565
104	3.114	1.260	8.898	3.601
104	3.467	1.254	9.905	3.583
104	3.809	1.235	10.883	3.530
104	4.133	1.232	11.808	3.519
104	4.469	1.214	12.768	3.468
104	4.810	1.186	13.744	3.368

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PLUME INTERNAL SHOCK COORDINATES, SET 5

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
106	0.000	0.330	0.000	0.969
106	0.124	0.490	0.356	1.425
106	0.261	0.620	0.745	1.796
106	0.450	0.750	1.311	2.170
106	0.693	0.866	1.981	2.474
106	0.921	0.927	2.632	2.647
106	1.293	0.990	3.694	2.830
106	1.612	1.045	4.606	2.985
106	2.013	1.060	5.751	3.052
106	2.334	1.095	6.660	3.130
106	2.648	1.083	7.567	3.094
106	3.002	1.070	8.578	3.079
106	3.370	1.055	9.620	3.014
106	3.640	1.026	10.401	2.932
106	4.085	0.995	11.672	2.843
106	4.540	0.912	12.097	2.605
106	4.894	0.843	13.984	2.407

PLUME INTERNAL SHOCK COORDINATES, SET 0

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
4	0.000	0.350	0.000	1.000
4	0.233	0.514	0.665	1.467
4	0.511	0.626	1.460	1.787
4	0.798	0.738	2.280	2.117
4	1.063	0.833	3.037	2.380
4	1.305	0.903	3.737	2.580
4	1.935	1.030	5.537	2.942
4	2.472	1.153	7.062	3.007
4	2.835	1.051	8.104	3.002

PLUME INTERNAL SHOCK COORDINATES, SET 0

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
6	0.000	0.350	0.000	1.000
6	0.290	0.580	0.830	1.682
6	0.421	0.686	1.282	1.960
6	0.630	0.802	1.800	2.202
6	0.864	0.910	2.470	2.600
6	1.144	1.032	3.270	2.950
6	1.418	1.120	4.052	3.200
6	2.061	1.293	5.890	3.605
6	2.395	1.351	6.842	3.860
6	2.793	1.403	7.980	4.010
6	3.161	1.449	9.032	4.140

PLUME INTERNAL SHOCK COORDINATES, SET 0

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
7	0.000	0.350	0.000	1.000
7	0.172	0.580	0.492	1.682
7	0.671	0.939	1.917	2.682
7	0.913	1.106	2.607	3.160
7	1.228	1.284	3.512	3.670
7	1.599	1.448	4.567	4.137
7	2.365	1.791	6.757	5.117

PLUME INTERNAL SHOCK COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
9	0.200	0.350	0.000	1.000
9	0.218	0.657	0.622	1.877
9	0.434	0.869	1.240	2.482
9	0.667	1.047	1.905	2.992
9	0.949	1.273	2.712	3.637
9	1.260	1.480	3.600	4.227
9	1.946	1.829	5.560	5.225
9	2.350	2.033	6.715	5.807
9	2.705	2.201	7.730	6.290

PLUME INTERNAL SHOCK COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
12	0.000	0.350	0.000	1.000
12	0.181	0.485	0.517	1.385
12	0.398	0.615	1.137	1.757
12	0.692	0.695	1.977	1.985
12	1.060	0.772	3.027	2.205
12	1.462	0.850	4.177	2.430
12	1.973	0.923	5.637	2.637
12	2.432	0.922	6.947	2.635

PLUME INTERNAL SHOCK COORDINATES, SET A

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
13	0.000	0.350	0.000	1.000
13	0.192	0.552	0.550	1.577
13	0.508	0.717	1.452	2.050
13	0.854	0.864	2.440	2.470
13	1.172	0.999	3.350	2.855

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
15	0.000	0.350	0.000	1.000
15	0.248	0.534	0.710	1.525
15	0.624	0.736	1.782	2.102
15	1.025	0.988	2.930	2.822
15	1.466	1.186	4.190	3.390
15	2.000	1.360	5.715	3.912
15	2.542	1.467	7.262	4.192
15	3.067	1.548	8.762	4.422
15	3.686	1.641	10.532	4.690

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
16	0.000	0.350	0.000	1.000
16	0.154	0.490	0.440	1.400
16	0.412	0.672	1.177	1.920
16	0.654	0.818	1.870	2.337
16	1.007	1.173	3.735	3.352
16	1.675	1.338	4.785	3.822
16	2.110	1.490	6.030	4.282
16	3.020	1.775	8.630	5.072
16	3.447	1.908	9.847	5.452
16	3.830	2.044	10.070	5.840
16	4.248	2.129	12.137	6.082

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
18	0.000	0.350	0.000	1.000
18	0.248	0.626	0.710	1.700
18	0.518	0.786	1.480	2.245
18	0.832	0.994	2.377	2.840
18	1.246	1.206	3.560	3.445
18	1.658	1.417	4.737	4.047
18	2.555	1.720	7.300	4.940
18	3.041	1.872	8.687	5.350
18	3.534	2.033	10.097	5.810
18	4.052	2.205	11.577	6.300

PLUME INTERNAL SHOCK COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
20	0.000	0.350	0.000	1.000
20	0.290	0.697	0.830	1.992
20	0.672	0.965	1.020	2.757
20	1.020	1.232	2.015	3.520
20	1.369	1.380	3.912	3.942
20	1.750	1.576	5.000	4.502
20	2.282	1.743	5.950	4.980
20	2.773	2.066	7.022	5.902
20	3.151	2.208	9.002	6.310
20	3.510	2.330	10.030	6.657

PLUME INTERNAL SHOCK COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
22	0.000	0.350	0.000	1.000
22	0.330	0.732	0.967	2.092
22	0.524	0.873	1.497	2.495
22	0.715	1.008	2.042	2.880
22	0.997	1.179	2.847	3.370
22	1.298	1.400	3.712	4.200
22	1.827	1.683	5.220	4.810
22	2.097	1.821	5.992	5.202
22	2.408	1.960	6.880	5.600
22	2.771	2.143	7.917	6.122
22	3.034	2.292	8.667	6.550
22	3.277	2.415	9.362	6.900

PLUME INTERNAL SHOCK COORDINATES, SET A

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
23	0.000	0.331	0.000	0.945
23	0.131	0.373	0.373	1.067
23	0.270	0.435	0.796	1.243
23	0.484	0.470	1.383	1.369
23	0.692	0.483	1.978	1.380
23	1.070	0.392	3.056	1.120
23	1.240	0.315	3.543	0.900
23	1.437	0.268	4.106	0.767

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
4	0.000	0.350	0.000	1.000
4	0.202	0.489	0.577	1.397
4	0.531	0.625	1.517	1.785
4	0.801	0.791	2.287	2.260
4	1.129	0.901	3.225	2.575
4	1.483	1.055	4.237	3.015
4	1.828	1.157	5.222	3.305
4	2.239	1.256	6.397	3.587
4	2.635	1.339	7.532	3.825
4	3.118	1.342	8.907	3.835
4	3.634	1.358	10.382	3.880

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
7	0.000	0.350	0.000	1.000
7	0.203	0.540	0.580	1.430
7	0.463	0.686	1.322	1.960
7	0.750	0.842	2.170	2.405
7	1.144	0.973	3.267	2.780
7	1.582	1.122	4.520	3.205
7	2.122	1.235	6.062	3.530
7	2.726	1.312	7.787	3.747
7	3.240	1.365	9.257	3.900
7	3.772	1.319	10.777	3.767
7	4.231	1.235	12.087	3.530
7	4.733	1.127	13.522	3.222
7	5.134	1.007	14.387	2.877

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
8	0.000	0.350	0.000	1.000
8	0.164	0.544	0.470	1.555
8	0.385	0.722	1.100	2.062
8	0.662	0.884	1.892	2.525
8	0.940	1.087	2.685	3.105
8	1.223	1.283	3.495	3.665
8	1.702	1.488	4.857	4.252
8	2.162	1.655	6.172	4.730
8	2.579	1.734	7.367	4.955
8	3.076	1.848	8.790	5.280
8	3.517	1.962	10.250	5.605
8	4.035	2.070	11.527	5.915

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
14	0.200	0.350	0.000	1.000
14	0.151	0.500	0.432	1.452
14	0.433	0.702	1.237	2.005
14	0.740	0.886	2.115	2.532
14	1.112	1.086	3.177	3.102
14	1.520	1.250	4.367	3.572
14	1.934	1.421	5.525	4.060
14	2.718	1.685	7.765	4.815
14	3.098	1.707	8.852	4.877
14	3.545	1.796	10.132	5.132

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
15	0.000	0.350	0.000	1.000
15	0.363	0.587	1.037	1.677
15	0.710	0.787	2.027	2.250
15	1.056	0.973	3.017	2.780
15	1.498	1.190	4.280	3.400
15	1.956	1.337	5.587	3.820
15	2.383	1.445	6.827	4.130
15	2.855	1.519	8.157	4.340
15	3.289	1.536	9.397	4.390
15	3.712	1.581	10.605	4.517
15	4.171	1.610	11.917	4.600

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
17	0.000	0.350	0.000	1.000
17	0.168	0.630	0.480	1.800
17	0.388	0.815	1.110	2.330
17	0.647	1.025	1.850	2.927
17	0.931	1.194	2.660	3.412
17	1.225	1.417	3.500	4.050
17	1.537	1.614	4.392	4.612
17	1.845	1.841	5.272	5.260
17	2.220	2.033	6.370	5.810
17	2.576	2.219	7.360	6.340
17	2.990	2.428	8.572	6.937
17	3.330	2.550	9.515	7.285

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
18	0.000	0.350	0.000	1.000
18	0.210	0.360	0.600	1.027
18	0.493	0.371	1.410	1.060
18	0.728	0.334	2.180	0.960

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
20	0.000	0.350	0.000	1.000
20	0.227	0.404	0.650	1.160
20	0.482	0.448	1.377	1.280
20	0.717	0.451	2.047	1.290
20	0.880	0.408	2.515	1.165
20	1.032	0.353	2.947	1.010
20	1.210	0.266	3.457	0.760
20	1.335	0.242	3.815	0.692

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
23	0.000	0.350	0.000	1.000
23	0.241	0.421	0.687	1.222
23	0.470	0.537	1.370	1.535
23	0.795	0.635	2.272	1.815
23	1.110	0.663	3.197	1.495
23	1.477	0.653	4.220	1.565
23	1.800	0.628	5.170	1.795
23	2.370	0.554	6.797	1.587
23	2.614	0.480	7.470	1.372
23	2.893	0.391	8.265	1.117
23	3.180	0.291	9.085	0.832
23	3.442	0.198	9.830	0.565

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
25	0.000	0.350	0.000	1.000
25	0.154	0.385	0.440	1.100
25	0.578	0.550	1.650	1.507
25	0.905	0.627	2.585	1.792
25	1.207	0.651	3.450	1.860
25	1.523	0.650	4.350	1.882
25	1.800	0.634	5.140	1.812
25	2.047	0.594	5.850	1.607
25	2.325	0.535	6.640	1.530
25	2.587	0.484	7.390	1.382
25	2.810	0.423	8.050	1.210

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
27	0.000	0.350	0.000	1.000
27	0.189	0.388	0.540	1.110
27	0.427	0.435	1.220	1.242
27	0.732	0.437	2.090	1.247
27	0.968	0.371	2.765	1.060
27	1.165	0.307	3.330	0.877
27	1.246	0.257	3.560	0.735

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
29	0.000	0.350	0.000	1.000
29	0.115	0.367	0.327	1.050
29	0.320	0.395	0.940	1.130
29	0.590	0.413	1.685	1.180
29	0.815	0.353	2.327	1.010
29	0.873	0.320	2.495	0.940

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REXIT
32	0.000	0.350	0.000	1.000
32	0.173	0.350	0.510	1.022
32	0.400	0.430	1.167	1.227
32	0.742	0.493	2.120	1.410
32	1.000	0.500	2.980	1.452
32	1.487	0.424	4.247	1.212
32	1.770	0.351	5.057	1.002
32	2.004	0.206	5.725	0.845

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/PEYIT	R/REXIT
33	0.000	0.350	0.000	1.000
33	0.210	0.444	0.600	1.270
33	0.515	0.584	1.470	1.670
33	0.862	0.682	2.460	1.950
33	1.191	0.714	3.400	2.040
33	1.550	0.680	4.430	1.967
33	1.923	0.650	5.495	1.882
33	2.254	0.600	6.440	1.740
33	2.544	0.564	7.270	1.612
33	2.815	0.491	8.040	1.402
33	3.010	0.402	8.600	1.150
33	3.318	0.325	9.480	0.927
33	3.573	0.234	10.210	0.667

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/PEYIT	R/REXIT
39	0.000	0.351	0.000	1.000
39	0.230	0.430	0.657	1.252
39	0.480	0.585	1.397	1.672
39	0.863	0.715	2.465	2.042
39	1.214	0.774	3.467	2.212
39	1.648	0.787	4.707	2.250
39	2.086	0.731	6.875	2.090
39	2.765	0.661	7.900	1.890
39	3.122	0.573	8.920	1.637
39	3.538	0.490	10.107	1.422
39	4.170	0.287	11.915	0.820

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
41	0.000	0.35	0.000	1.000
41	0.260	0.410	0.770	1.197
41	0.653	0.461	1.865	1.317
41	0.973	0.375	2.780	1.072
41	1.359	0.236	3.862	0.675
41	1.505	0.136	4.300	0.392

PLUME INTERNAL SHOCK COORDINATES, SET 1

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
43	0.000	0.350	0.000	1.000
43	0.171	0.367	0.487	1.047
43	0.418	0.420	1.195	1.200
43	0.677	0.414	1.735	1.182
43	0.809	0.318	2.867	0.913
43	1.076	0.232	3.075	0.662
43	1.153	0.190	3.295	0.570

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
1	0.000	0.350	0.000	1.000
1	0.133	0.460	0.387	1.315
1	0.335	0.536	0.957	1.532
1	0.538	0.665	1.537	1.900
1	0.778	0.743	2.222	2.122
1	1.040	0.804	2.072	2.297
1	1.487	0.848	4.247	2.422
1	1.844	0.851	5.267	2.432
1	2.198	0.851	6.280	2.432
1	2.520	0.820	7.200	2.370
1	2.817	0.798	8.750	2.280
1	3.066	0.766	8.760	2.187
1	3.230	0.711	9.227	2.032
1	3.437	0.653	9.820	1.865
1	3.692	0.614	10.547	1.755
1	3.913	0.556	11.180	1.500
1	4.143	0.480	11.837	1.372
1	4.367	0.421	12.477	1.202
1	4.490	0.380	12.830	1.085

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
3	0.000	0.350	0.000	1.000
3	0.087	0.380	0.250	1.112
3	0.202	0.460	0.577	1.340
3	0.378	0.532	1.080	1.520
3	0.566	0.573	1.617	1.637
3	0.780	0.587	2.230	1.677
3	0.917	0.556	2.620	1.500
3	1.081	0.514	3.090	1.470
3	1.260	0.479	3.600	1.370
3	1.460	0.410	4.197	1.197
3	1.663	0.332	4.752	0.950
3	1.820	0.273	5.200	0.780

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PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
5	0.000	0.350	0.000	1.000
5	0.106	0.388	0.302	1.110
5	0.217	0.428	0.620	1.222
5	0.368	0.491	1.052	1.402
5	0.500	0.514	1.430	1.470
5	0.700	0.504	2.002	1.440
5	0.931	0.487	2.662	1.392
5	1.124	0.446	3.212	1.275
5	1.428	0.334	4.082	0.955
5	1.698	0.274	4.565	0.782
5	1.648	0.255	4.712	0.727

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
7	0.000	0.350	0.000	1.000
7	0.175	0.426	0.502	1.217
7	0.314	0.508	0.912	1.452
7	0.524	0.612	1.497	1.750
7	0.744	0.682	2.125	1.950
7	0.990	0.750	2.827	2.170
7	1.253	0.784	3.580	2.240
7	1.475	0.793	4.215	2.265
7	1.688	0.803	4.822	2.295
7	1.872	0.773	5.347	2.210
7	2.124	0.766	6.072	2.190
7	2.346	0.766	6.702	2.190
7	2.540	0.740	7.282	2.140
7	2.727	0.717	7.792	2.050
7	3.062	0.656	8.750	1.875
7	3.258	0.612	9.310	1.747
7	3.423	0.573	9.780	1.637
7	3.563	0.526	10.180	1.502
7	3.737	0.483	10.677	1.380
7	4.140	0.370	11.830	1.082
7	4.323	0.297	12.352	0.847
7	4.404	0.276	12.582	0.790

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
9	0.100	0.350	0.000	1.000
9	0.134	0.454	0.382	1.297
9	0.227	0.563	0.647	1.607
9	0.358	0.661	1.022	1.890
9	0.513	0.731	1.465	2.290
9	0.669	0.808	1.885	2.310
9	0.822	0.857	2.350	2.450
9	1.116	0.932	3.100	2.577
9	1.331	0.924	3.802	2.640
9	1.562	0.948	4.462	2.707
9	2.042	0.994	5.835	2.840
9	2.220	0.983	6.370	2.510
9	2.465	0.980	7.042	2.800
9	2.720	0.971	7.772	2.775
9	2.948	0.950	8.422	2.740
9	3.384	0.930	9.667	2.670
9	3.594	0.930	10.270	2.657
9	3.833	0.924	10.952	2.640
9	4.043	0.911	11.552	2.602
9	4.257	0.892	12.162	2.547
9	4.487	0.874	12.820	2.497
9	4.688	0.836	13.395	2.387
9	5.071	0.753	14.490	2.152

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
11	0.000	0.350	0.000	1.000
11	0.114	0.453	0.325	1.295
11	0.244	0.528	0.697	1.507
11	0.493	0.616	1.410	1.760
11	0.783	0.660	2.237	1.912
11	1.011	0.682	2.890	1.950
11	1.592	0.640	4.547	1.830
11	1.885	0.610	5.385	1.770
11	2.176	0.577	6.217	1.650
11	2.484	0.535	7.097	1.530
11	2.666	0.450	7.617	1.285
11	2.936	0.377	8.387	1.077
11	3.267	0.281	9.335	0.802
11	3.517	0.185	10.047	0.530

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
13	0.000	0.350	0.000	1.000
13	0.094	0.551	0.267	1.575
13	0.210	0.647	0.600	1.847
13	0.390	0.729	1.115	2.082
13	0.566	0.832	1.617	2.377
13	0.752	0.937	2.147	2.677
13	0.940	0.980	2.685	2.800
13	1.151	1.006	3.287	2.875
13	1.432	1.068	4.092	3.052
13	1.686	1.111	4.817	3.175
13	1.988	1.148	5.680	3.280
13	2.254	1.196	6.440	3.417
13	2.572	1.221	7.347	3.487
13	3.153	1.255	9.007	3.585
13	3.437	1.256	9.820	3.590
13	3.720	1.245	10.630	3.557
13	3.986	1.242	11.387	3.550
13	4.270	1.228	12.200	3.507
13	4.570	1.217	13.057	3.477
13	4.885	1.196	13.957	3.417
13	5.160	1.172	14.770	3.347

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
15	0.000	0.354	0.000	1.200
15	0.110	0.533	0.340	1.522
15	0.262	0.666	0.750	1.902
15	0.479	0.808	1.370	2.307
15	0.729	0.928	2.082	2.652
15	0.984	1.030	2.812	2.942
15	1.324	1.109	3.782	3.167
15	1.607	1.237	4.592	3.535
15	1.918	1.350	5.480	3.882
15	2.259	1.473	6.455	4.207
15	3.000	1.624	8.572	4.640
15	3.340	1.648	9.542	4.707
15	3.725	1.702	10.642	4.862
15	4.088	1.724	11.680	4.925
15	4.399	1.762	12.570	5.035
15	4.795	1.790	13.700	5.115

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
17	0.000	0.350	0.000	1.000
17	0.122	0.650	0.350	1.882
17	0.292	0.824	0.835	2.355
17	0.570	0.948	1.627	2.707
17	0.806	1.061	2.302	3.032
17	1.050	1.150	3.000	3.285
17	1.326	1.253	3.790	3.580
17	1.592	1.364	4.550	3.897
17	1.866	1.472	5.332	4.205
17	2.156	1.539	6.160	4.397
17	2.434	1.623	6.955	4.637
17	2.730	1.727	7.800	4.935
17	3.034	1.808	8.670	5.165
17	3.333	1.888	9.522	5.395

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
19	0.000	0.350	0.000	1.000
19	0.136	0.696	0.390	1.000
19	0.336	0.891	0.960	2.545
19	0.564	1.032	1.612	2.950
19	1.117	1.291	3.192	3.690
19	1.470	1.445	4.200	4.130
19	1.816	1.592	5.190	4.547
19	2.159	1.714	6.170	4.897
19	2.493	1.820	7.122	5.200
19	3.161	1.988	9.032	5.680
19	3.626	2.086	10.360	5.960
19	3.994	2.191	11.412	6.260
19	4.421	2.257	12.632	6.450
19	5.249	2.376	14.425	6.790
19	5.404	2.435	15.440	6.957

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
21	0.000	0.350	0.000	1.000
21	0.112	0.535	0.320	1.527
21	0.243	0.602	0.695	1.720
21	0.374	0.713	1.070	2.037
21	0.533	0.798	1.522	2.280
21	0.707	0.847	2.020	2.420
21	0.892	0.897	2.550	2.562
21	1.143	0.945	3.265	2.700
21	1.389	0.979	3.970	2.797
21	1.823	1.046	5.210	2.990
21	2.073	1.068	5.922	3.052
21	2.297	1.095	6.562	3.127
21	2.587	1.123	7.392	3.210
21	2.824	1.140	8.070	3.257
21	3.017	1.151	8.622	3.290
21	3.246	1.161	9.275	3.317
21	3.444	1.141	9.840	3.260
21	3.669	1.129	10.482	3.225

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
25	0.000	0.350	0.000	1.000
25	0.188	0.613	0.537	1.752
25	0.289	0.716	0.825	2.045
25	0.466	0.824	1.332	2.297
25	0.645	0.891	1.942	2.545
25	0.864	0.951	2.467	2.717
25	1.073	0.994	3.065	2.840
25	1.290	1.035	3.685	2.957
25	1.536	1.078	4.387	3.180
25	1.760	1.100	5.030	3.167
25	1.996	1.137	5.702	3.247
25	2.203	1.165	6.295	3.327
25	2.557	1.193	7.325	3.410
25	2.882	1.227	8.235	3.505
25	3.167	1.215	9.247	3.480
25	3.430	1.204	9.825	3.440

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REVIT	R/REVIT
27	0.000	0.350	0.000	1.000
27	0.163	0.604	0.465	1.725
27	0.330	0.716	0.070	2.045
27	0.524	0.802	1.497	2.292
27	0.819	0.889	2.340	2.540
27	1.213	0.074	3.465	2.782
27	1.599	1.044	4.570	2.982
27	2.743	1.093	5.837	3.122
27	2.526	1.124	7.217	3.212
27	2.008	1.142	8.307	3.262
27	3.231	1.126	9.232	3.217
27	3.535	1.114	10.100	3.182
27	3.958	1.082	11.307	3.002
27	4.315	1.046	12.327	2.987
27	4.665	1.024	13.327	2.925
27	4.934	0.977	14.097	2.792

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REVIT	R/REVIT
31	0.000	0.350	0.000	1.000
31	0.104	0.654	0.297	1.870
31	0.252	0.804	0.720	2.297
31	0.437	0.951	1.250	2.717
31	0.684	1.068	1.955	3.352
31	1.023	1.250	2.922	3.597
31	1.295	1.388	3.700	3.965
31	1.581	1.508	4.517	4.307
31	1.942	1.641	5.550	4.687
31	2.292	1.754	6.550	5.012
31	2.670	1.860	7.627	5.340
31	3.027	1.938	8.647	5.680
31	4.591	2.342	13.117	6.692
31	5.018	2.418	14.337	6.910
31	5.361	2.457	15.317	7.020

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	V/REFIT	R/REFIT
34	2.000	2.350	2.000	1.000
34	2.153	2.514	2.437	1.467
34	2.400	2.688	1.142	1.965
34	2.670	2.770	1.049	2.225
34	2.934	2.854	2.670	2.427
34	1.232	2.864	3.520	2.457
34	1.548	2.870	4.420	2.512
34	2.137	2.877	6.185	2.505
34	2.508	2.846	7.165	2.417
34	2.884	2.820	8.240	2.367
34	3.166	2.780	9.445	2.227
34	3.460	2.718	9.912	2.452
34	3.804	2.650	10.870	1.682
34	4.134	2.578	11.812	1.652
34	4.436	2.494	12.675	1.417
34	4.724	2.387	13.440	1.145

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
33	0.000	0.351	0.000	1.000
33	0.102	0.575	0.292	1.642
33	0.340	0.716	0.972	2.045
33	0.633	0.813	1.810	2.322
33	0.956	0.876	2.732	2.502
33	1.332	0.885	3.805	2.527
33	1.704	0.907	4.870	2.502
33	2.101	0.914	6.002	2.612
33	2.474	0.889	7.070	2.540
33	3.005	0.781	8.842	2.232
33	3.482	0.723	9.950	2.065
33	3.868	0.661	11.052	1.890
33	4.226	0.551	12.075	1.572
33	4.518	0.450	12.910	1.312

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
37	0.000	0.350	0.000	1.000
37	0.141	0.532	0.402	1.520
37	0.351	0.630	1.002	1.800
37	0.570	0.714	1.632	2.040
37	0.850	0.766	2.430	2.190
37	1.113	0.756	3.180	2.160
37	1.460	0.714	4.740	2.040
37	2.016	0.681	5.760	1.945
37	2.378	0.630	6.790	1.800
37	2.621	0.563	7.490	1.607
37	2.857	0.490	8.162	1.420
37	3.153	0.437	9.010	1.250
37	3.424	0.370	9.782	1.057

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PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
38	0.200	0.354	0.000	1.000
38	0.146	0.605	0.417	1.730
38	0.390	0.767	1.140	2.192
38	0.450	0.864	1.882	2.470
38	0.977	0.939	2.792	2.680
38	1.262	0.963	3.605	2.810
38	1.603	1.015	4.582	2.910
38	1.879	1.053	5.370	3.010
38	2.257	1.074	6.450	3.270
38	2.600	1.056	7.427	3.017
38	3.230	1.018	9.230	2.910
38	3.591	0.973	10.260	2.780
38	3.944	0.934	11.270	2.667
38	4.343	0.888	12.400	2.537
38	4.732	0.815	13.520	2.330
38	5.050	0.726	14.427	2.075

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
43	0.200	0.354	0.000	1.000
43	0.498	0.540	1.096	1.570
43	1.035	0.605	2.057	1.730
43	1.410	0.661	4.027	1.390
43	2.637	0.650	7.535	1.082
43	4.136	0.655	11.817	1.872

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
44	0.000	0.350	0.000	1.000
44	0.127	0.613	0.362	1.752
44	0.322	0.876	0.922	2.502
44	0.602	1.166	1.720	3.332
44	0.882	1.506	2.520	4.302
44	1.071	1.824	3.060	5.212
44	1.362	2.157	3.892	6.162
44	1.589	2.475	4.542	7.072
44	1.842	2.773	5.262	7.922
44	2.143	2.044	6.122	8.412
44	2.441	3.234	6.275	9.240
44	2.712	3.455	7.752	9.872
44	3.040	3.761	8.712	10.745
44	3.330	4.040	9.542	11.542
44	3.605	4.253	10.320	12.152
44	3.797	4.357	10.850	12.450

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
46	0.000	0.350	0.000	1.000
46	0.128	0.620	0.365	1.797
46	0.277	0.830	0.792	2.372
46	0.478	1.025	1.365	2.930
46	0.688	1.201	1.965	3.432
46	0.872	1.352	2.432	3.862
46	1.050	1.555	3.025	4.442
46	1.288	1.710	3.680	4.912
46	1.496	1.885	4.275	5.385
46	1.720	2.074	4.915	5.925
46	2.005	2.263	5.732	6.465

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
48	0.700	0.350	0.000	1.000
48	0.104	0.590	0.297	1.712
48	0.290	0.759	0.830	2.170
48	0.696	1.249	1.990	3.567
48	0.945	1.472	2.700	4.205
48	1.242	1.683	3.550	4.810
48	1.515	2.023	4.327	5.780
48	1.782	2.262	5.092	6.462
48	2.084	2.432	5.955	6.947
48	2.376	2.767	6.790	7.905

PLUME INTERNAL SHOCK COORDINATES, SET 2

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
50	0.000	0.350	0.000	1.000
50	0.104	0.647	0.297	1.850
50	0.259	0.872	0.740	2.492
50	0.440	1.044	1.257	2.982
50	0.602	1.220	1.720	3.485
50	1.001	1.580	2.860	4.537
50	1.231	1.785	3.517	5.100
50	1.474	1.998	4.212	5.710
50	1.736	2.200	4.960	6.312
50	1.978	2.434	5.652	6.955
50	2.253	2.623	6.437	7.495
50	2.555	2.824	7.302	8.067
50	2.824	2.982	8.077	8.520

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
1	0.000	0.350	0.000	1.000
1	0.100	0.500	0.307	1.700
1	0.213	0.717	0.610	2.447
1	0.334	0.790	0.655	2.200
1	0.535	1.000	1.527	2.577
1	0.731	1.075	2.090	2.705
1	0.927	1.035	2.650	2.957
1	1.151	1.090	3.207	3.137
1	1.380	1.151	3.067	3.207
1	1.704	1.214	4.067	3.400
1	1.980	1.280	5.600	3.657
1	2.265	1.337	6.470	3.020
1	2.523	1.363	7.297	3.805
1	2.824	1.397	8.077	3.992
1	3.154	1.431	9.010	4.000
1	3.433	1.452	9.007	4.147
1	3.760	1.456	10.767	4.160
1	4.260	1.482	11.600	4.235
1	4.375	1.500	12.500	4.300
1	4.703	1.531	13.437	4.375

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
3	0.000	0.350	0.000	1.000
3	0.100	0.500	0.310	1.570
3	0.310	0.710	0.907	2.030
3	0.567	0.843	1.620	2.407
3	0.976	0.920	2.500	2.627
3	1.484	1.030	4.240	2.950
3	1.851	1.067	5.207	3.050
3	2.201	1.091	6.207	3.117
3	2.551	1.113	7.207	3.100
3	2.922	1.106	8.347	3.160
3	3.307	1.102	9.450	3.147
3	3.720	1.095	10.630	3.130
3	4.263	1.073	11.610	3.065
3	4.406	1.059	12.507	2.970

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
5	0.000	0.350	0.000	1.000
5	0.261	0.734	0.745	2.097
5	0.572	0.902	1.635	2.577
5	0.901	1.096	2.575	2.845
5	1.241	1.286	3.545	3.102
5	1.614	1.150	4.612	3.307
5	2.008	1.214	5.737	3.467
5	2.390	1.271	6.855	3.632
5	2.809	1.298	8.025	3.707
5	3.218	1.334	9.195	3.812
5	3.560	1.380	10.197	3.970

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
7	0.000	0.350	0.000	1.000
7	0.133	0.458	0.380	1.307
7	0.319	0.584	0.912	1.670
7	0.588	0.720	1.680	2.057
7	0.904	0.837	2.582	2.392
7	1.234	0.908	3.525	2.595
7	1.575	0.954	4.500	2.725
7	1.914	0.981	5.470	2.802
7	2.583	0.983	7.380	2.810
7	3.032	0.959	8.662	2.740
7	3.437	0.923	9.820	2.637
7	3.748	0.896	10.710	2.560

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
9	0.000	0.350	0.000	1.000
9	0.357	0.535	1.020	1.530
9	0.637	0.608	1.820	1.737
9	0.932	0.636	2.662	1.817
9	1.272	0.601	3.635	1.717
9	1.601	0.540	4.575	1.570
9	2.213	0.388	6.322	1.110
9	2.600	0.256	7.430	0.732

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REVIT	R/REFIT
11	0.000	0.350	0.000	1.000
11	0.157	0.462	0.447	1.320
11	0.374	0.566	1.070	1.617
11	0.632	0.633	1.805	1.810
11	1.175	0.628	3.357	1.795
11	1.469	0.602	4.197	1.720
11	1.725	0.563	4.930	1.607
11	2.027	0.504	5.792	1.440
11	2.356	0.397	6.732	1.135
11	2.700	0.291	7.740	0.832
11	2.808	0.251	8.022	0.717

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REVIT	R/REFIT
13	0.000	0.350	0.000	1.000
13	0.238	0.577	0.680	1.647
13	0.470	0.735	1.342	2.100
13	0.752	0.867	2.150	2.477
13	1.067	0.976	3.050	2.790
13	1.375	1.042	3.930	2.977
13	1.723	1.076	4.922	3.075
13	2.048	1.121	5.852	3.202
13	2.745	1.137	7.842	3.247
13	3.130	1.144	8.970	3.270
13	3.440	1.133	9.830	3.237
13	3.770	1.112	10.797	3.177
13	4.137	1.074	11.820	3.070
13	4.798	0.950	13.710	2.715
13	5.180	0.800	14.825	2.570
13	5.541	0.810	15.832	2.340
13	5.755	0.742	16.442	2.120

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
15	0.000	0.354	0.000	1.000
15	0.262	0.528	0.747	1.510
15	0.570	0.689	1.630	1.967
15	0.920	0.791	2.627	2.260
15	1.274	0.853	3.640	2.437
15	1.654	0.883	4.732	2.522
15	1.977	0.896	5.647	2.560
15	2.387	0.872	6.823	2.492
15	2.761	0.854	7.887	2.440
15	3.100	0.813	8.857	2.322
15	3.638	0.683	10.395	1.952
15	3.978	0.621	11.365	1.775
15	4.290	0.528	12.257	1.507
15	4.602	0.430	13.147	1.230
15	5.032	0.274	14.377	0.782

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	X (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
19	0.000	0.350	0.000	1.000
19	0.202	0.450	0.577	1.285
19	0.441	0.520	1.260	1.485
19	0.806	0.521	2.302	1.487
19	1.092	0.490	3.120	1.400
19	1.420	0.395	4.082	1.127
19	1.768	0.297	5.052	0.850
19	2.020	0.174	5.772	0.497

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REXIT	R/REXIT
21	0.000	0.350	0.000	1.000
21	0.188	0.461	0.537	1.317
21	0.877	0.696	2.505	1.987
21	1.245	0.764	3.557	2.182
21	1.689	0.801	4.825	2.287
21	2.127	0.768	6.077	2.195
21	2.596	0.723	7.417	2.065
21	3.179	0.653	9.082	1.865
21	3.594	0.563	10.267	1.607
21	3.850	0.462	11.025	1.320

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
23	0.000	0.350	0.000	1.000
23	0.255	0.430	0.730	1.230
23	0.535	0.476	1.530	1.360
23	1.031	0.427	2.045	1.220
23	1.327	0.350	3.792	1.025
23	1.565	0.277	4.472	0.792

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REXIT	R/REXIT
25	0.000	0.350	0.000	1.000
25	0.297	0.543	0.850	1.552
25	0.601	0.669	1.717	1.912
25	1.151	0.807	3.287	2.305
25	1.537	0.867	4.392	2.477
25	1.931	0.891	5.617	2.545
25	2.295	0.873	6.557	2.495
25	2.720	0.853	7.772	2.437
25	3.149	0.786	8.997	2.245
25	3.423	0.771	9.780	2.202
25	3.695	0.725	10.557	2.072
25	3.986	0.646	11.387	1.845
25	4.340	0.556	12.400	1.587
25	4.514	0.508	12.897	1.452

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	X (INCHES)	R (INCHES)	X/REXIT	R/REXIT
27	0.000	0.350	0.000	1.000
27	0.613	0.714	1.752	2.040
27	1.025	0.856	2.930	2.445
27	1.487	0.941	4.250	2.690
27	1.959	0.960	5.597	2.767
27	2.443	0.973	6.980	2.780
27	2.933	0.948	8.380	2.707
27	3.219	0.896	9.197	2.560
27	3.636	0.831	10.387	2.375
27	4.039	0.756	11.540	2.160
27	4.459	0.686	12.740	1.960
27	4.854	0.597	13.870	1.705
27	5.550	0.332	15.857	0.950

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
29	0.000	0.350	0.000	1.000
29	0.241	0.615	0.690	1.757
29	0.465	0.788	1.330	2.252
29	0.749	0.948	2.140	2.707
29	1.166	1.178	3.332	3.365
29	1.471	1.406	4.202	4.017
29	1.809	1.577	5.170	4.505
29	2.200	1.706	6.312	4.875
29	2.662	1.856	7.605	5.302
29	3.117	2.005	8.905	5.727
29	3.540	2.169	10.140	6.197
29	4.126	2.300	11.790	6.572

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
31	0.000	0.350	0.000	1.000
31	0.203	0.598	0.580	1.707
31	0.413	0.815	1.180	2.327
31	0.662	1.051	1.892	3.002
31	0.952	1.263	2.720	3.610
31	1.244	1.480	3.555	4.230
31	1.569	1.734	4.482	4.955
31	2.318	2.136	6.622	6.102
31	2.687	2.313	7.677	6.610
31	3.104	2.497	8.867	7.135
31	4.018	2.854	11.480	8.155
31	4.331	2.960	12.375	8.457

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
33	0.000	0.350	0.000	1.000
33	0.220	0.847	0.627	2.305
33	0.465	1.055	1.330	3.015
33	0.692	1.293	1.977	3.695
33	0.951	1.545	2.717	4.415
33	1.262	1.784	3.605	5.207
33	1.585	1.981	4.530	5.660
33	1.920	2.155	5.485	6.157
33	2.267	2.411	6.477	6.800
33	2.635	2.565	7.527	7.327
33	3.028	2.836	8.652	8.102
33	3.286	2.935	9.387	8.385

PLUME INTERNAL SHOCK COORDINATES, SET 3

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REYIT	R/REYIT
36	0.000	0.350	0.000	1.000
36	0.227	0.817	0.647	2.315
36	0.535	1.141	1.527	3.260
36	0.783	1.396	2.237	3.900
36	1.053	1.646	3.007	4.702
36	1.428	1.877	4.080	5.362
36	1.728	2.066	4.937	5.902
36	2.044	2.326	5.840	6.645
36	2.393	2.475	6.837	7.172
36	2.740	2.647	7.827	7.562
36	3.048	2.812	8.707	8.152

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
56	0.000	0.350	0.000	1.000
56	0.197	0.560	0.562	1.725
56	0.454	0.737	1.297	2.105
56	0.766	0.827	2.190	2.305
56	1.138	0.850	3.252	2.455
56	1.552	0.898	4.435	2.565
56	1.964	0.913	5.612	2.607
56	2.443	0.990	6.080	2.570
56	2.831	0.852	8.090	2.452
56	3.248	0.823	9.280	2.352
56	3.605	0.757	10.700	2.162
56	3.958	0.716	11.312	2.045
56	4.264	0.620	12.182	1.797

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
58	0.000	0.350	0.000	1.000
58	0.137	0.560	0.392	1.600
58	0.305	0.755	0.872	2.157
58	0.573	0.888	1.637	2.537
58	0.841	0.971	2.402	2.775
58	1.161	1.040	3.317	2.972
58	1.618	1.140	4.622	3.257
58	2.047	1.231	5.850	3.517
58	2.446	1.280	6.987	3.657
58	2.871	1.318	8.202	3.765
58	3.684	1.353	10.525	3.857
58	4.167	1.333	11.005	3.810
58	4.622	1.297	13.205	3.705
58	5.335	1.253	15.242	3.580
58	5.688	1.225	16.252	3.500
58	6.108	1.172	17.452	3.347
58	6.362	1.128	18.177	3.222

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
60	0.000	0.350	0.000	1.000
60	0.172	0.422	0.507	1.777
60	0.430	0.820	1.227	2.370
60	0.861	0.987	2.460	2.820
60	1.609	1.190	4.597	3.425
60	2.075	1.305	5.027	3.730
60	2.579	1.370	7.367	3.940
60	3.104	1.443	8.867	4.122
60	3.650	1.479	10.430	4.225
60	4.262	1.492	12.177	4.262
60	4.787	1.483	13.677	4.237

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	X/REFIT	R/REFIT
62	0.000	0.350	0.000	1.000
62	0.213	0.710	0.610	2.027
62	0.577	0.920	1.647	2.630
62	1.008	1.094	2.880	3.125
62	1.463	1.221	4.180	3.490
62	1.911	1.345	5.460	3.842
62	2.443	1.460	6.980	4.197
62	2.965	1.553	8.470	4.437
62	3.566	1.582	10.190	4.520
62	4.089	1.622	11.682	4.635
62	4.642	1.662	13.262	4.747
62	5.393	1.652	15.410	4.720

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
72	0.000	0.350	0.000	1.000
72	0.105	0.617	0.300	1.762
72	0.273	0.755	0.780	2.157
72	0.506	0.890	1.445	2.542
72	0.740	0.981	2.140	2.802
72	1.036	1.063	2.960	3.037
72	1.327	1.141	3.792	3.260
72	1.673	1.214	4.780	3.467
72	2.054	1.268	5.870	3.622
72	2.523	1.342	7.210	3.835
72	3.395	1.410	9.700	4.030
72	3.931	1.422	11.232	4.062
72	4.333	1.415	12.380	4.042
72	5.134	1.387	14.670	3.962
72	5.610	1.408	16.030	4.022

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	X (INCHES)	R (INCHES)	X/REFIT	R/REFIT
74	0.000	0.354	0.000	1.000
74	0.182	0.560	0.520	1.600
74	0.398	0.703	1.137	2.007
74	0.700	0.794	2.000	2.267
74	1.044	0.836	2.982	2.390
74	1.443	0.840	4.122	2.425
74	1.925	0.853	5.500	2.437
74	2.405	0.811	6.872	2.317
74	2.857	0.762	8.162	2.177
74	3.375	0.702	10.642	2.005
74	3.773	0.627	10.780	1.792
74	4.240	0.518	12.140	1.480
74	4.688	0.388	13.395	1.110
74	5.107	0.253	14.592	0.722

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
76	0.000	0.350	0.000	1.000
76	0.133	0.540	0.380	1.550
76	0.266	0.651	0.760	1.860
76	0.500	0.800	1.430	2.310
76	0.840	0.910	2.420	2.605
76	1.280	0.000	3.680	2.825
76	1.720	1.035	4.930	2.957
76	2.157	1.070	6.160	3.080
76	2.600	1.136	7.560	3.245
76	3.000	1.110	9.160	3.177
76	3.801	1.067	10.860	3.050
76	4.691	0.980	13.400	2.800

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
82	0.000	0.350	0.000	1.000
82	0.114	0.620	0.325	1.707
82	0.267	0.761	0.760	2.175
82	0.507	0.941	1.450	2.687
82	0.787	1.095	2.250	3.130
82	1.165	1.205	3.330	3.672
82	1.610	1.435	4.600	4.100
82	2.086	1.560	5.960	4.400
82	2.565	1.690	7.330	4.827
82	3.101	1.770	8.860	5.000
82	3.703	1.851	10.580	5.290
82	4.641	1.907	13.260	5.450
82	5.093	1.925	14.550	5.500

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
R4	0.000	0.350	0.000	1.000
R4	0.154	0.584	0.440	1.667
R4	0.320	0.738	0.940	2.110
R4	0.615	0.892	1.757	2.547
R4	0.948	0.974	2.710	2.782
R4	1.422	1.081	4.062	3.087
R4	1.883	1.158	5.380	3.307
R4	2.247	1.190	6.420	3.400
R4	2.635	1.222	7.530	3.492
R4	3.032	1.254	8.662	3.580
R4	4.112	1.246	11.757	3.560
R4	4.631	1.200	13.232	3.427
R4	5.195	1.144	14.842	3.270
R4	5.680	1.106	16.230	3.160

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REYIT	R/REYIT
R6	0.000	0.350	0.000	1.000
R6	0.136	0.587	0.387	1.677
R6	0.321	0.753	0.917	2.152
R6	0.654	0.909	1.867	2.597
R6	0.976	1.035	2.787	2.957
R6	1.385	1.172	3.957	3.350
R6	1.816	1.255	5.190	3.585
R6	2.318	1.365	6.622	3.900
R6	2.796	1.449	7.087	4.140
R6	3.300	1.490	9.427	4.257
R6	3.788	1.513	10.822	4.322
R6	4.284	1.530	12.240	4.397
R6	4.763	1.557	13.607	4.450

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
48	0.700	0.350	0.000	1.400
48	0.122	0.514	0.350	1.467
48	0.360	0.704	1.055	2.412
48	1.158	0.078	3.307	2.795
48	1.678	1.063	4.795	3.037
48	2.175	1.134	6.215	3.240
48	2.635	1.178	7.530	3.365
48	3.160	1.200	9.055	3.427
48	3.717	1.161	10.620	3.317
48	4.231	1.124	12.087	3.212
48	4.928	1.088	14.080	3.107

PLUME INTERNAL SHOCK COORDINATES, SET 4

PHOTO NO.	Y (INCHES)	R (INCHES)	Y/REFIT	R/REFIT
00	0.000	0.350	0.000	1.400
00	0.165	0.501	0.472	1.432
00	0.366	0.668	1.045	1.910
00	0.673	0.771	1.922	2.202
00	0.982	0.817	2.805	2.335
00	1.341	0.851	3.832	2.427
00	1.814	0.863	5.182	2.465
00	2.234	0.842	6.382	2.405
00	3.113	0.767	8.895	2.192
00	3.407	0.721	9.735	2.060
00	3.705	0.650	10.585	1.882
00	4.045	0.571	11.557	1.632
00	4.490	0.508	12.830	1.452